

JUNIOR HIGH  
INDUSTRIAL  
EDUCATION  
GUIDE

Albena  
1976

TT  
168  
A315  
1976

ALTA  
373.1967  
1976  
Gr.7-9

CURRGDHT

CURR



## ACKNOWLEDGMENTS

The Alberta Education acknowledges with appreciation the contribution of the following Ad Hoc Committee members to the preparation of this guide.

### JUNIOR HIGH INDUSTRIAL EDUCATION AD HOC COMMITTEE

- |                                  |   |
|----------------------------------|---|
| Mr. A. A. Day (Chairman)         | - Industrial Education Consultant, Alberta Education, Edmonton  |
| Mr. R. Baker                     | - H. D. Cartwright Junior High School, Calgary  |
| Mr. A. Deane                     | - Assistant Professor, Department of Industrial & Vocational Education, University of Alberta, Edmonton |
| Dr. A. Meyer                     | - Associate Professor, Department of Industrial & Vocational Education, University of Alberta           |
| Mr. W. Michalcheon               | - Curriculum Consultant, Rosslyn Junior High School, Edmonton   |
| Dr. A. E. Morris                 | - Supervisor of Industrial Education, Calgary Board of Education, Calgary                               |
| Mr. J. Pallas                    | - Bonnie Doon Composite High School, Edmonton   |
| Mr. D. Rawlinson                 | - Chestermere Junior/Senior High School, Chestermere  |
| Mr. E. Rudyk                     | - D. S. McKenzie Junior High School, Edmonton   |
| Mr. J. Shore                     | - St. Nicholas Junior High School, Edmonton   |
| Dr. J. D. Harder                 | - Associate Director of Curriculum, Alberta Education, Edmonton   |
| Mr. J. C. Smith                  | - Industrial Education Consultant, Alberta Education, Calgary Regional Office, Calgary                  |
| Mr. M. Shykora                   | - Industrial Education Consultant, Alberta Education, Edmonton  |
| Mr. V. J. Yuschyshyn<br>(Editor) | - F. E. Osborne Junior High School, Calgary   |

#### NOTE:

This Curriculum Guide is a service publication only. The official statement concerning the course is contained in the Junior High School Program of Studies. The information contained in the Guide is prescriptive insofar as it duplicates that contained in the Program of Studies. The Guide, however, contains as well as content, methods of developing the concepts, suggestions for the use of teaching aids and additional reference books.



TABLE OF CONTENTS

I.	INTRODUCTION .....	1
II.	OBJECTIVES OF THE INDUSTRIAL EDUCATION .....	1
III.	DEFINITION OF TERMS .....	3
IV.	THE MULTIPLE-ACTIVITY PROGRAM .....	4
V.	HOW TO USE THE GUIDE .....	7
VI.	SAFETY EDUCATION PROGRAM .....	10
VII.	GENERAL INFORMATION .....	12
VIII.	COURSE CONTENT .....	15
	A. Power Technology .....	17
	1. Electricity .....	P.T. 1 21
	2. Electronics/Computer .....	P.T. 2 31
	3. Power Mechanics .....	P.T. 3 39
	B. Materials Technology .....	51
	1. Earths .....	M.T. 1 55
	2. Lapidary and Art Metals .....	M.T. 2 61
	3. Leather and Textiles .....	M.T. 3 67
	4. Metals .....	M.T. 4 73
	5. Plastics .....	M.T. 5 79
	6. Woods .....	M.T. 6 85
	C. Visual Communications Technology .....	91
	1. Graphics .....	V.C. 1 95
	2. Photography/Drafting .....	V.C. 2 103
	D. Synthesizing Modules .....	111
	1. Construction .....	S.M. 1 113
	2. Industrial Simulation .....	S.M. 2 121
	3. Consumerism .....	S.M. 3 129
	4. Student Contracting .....	S.M. 4 139
	5. Developmental Research .....	S.M. 5 141



## I. INTRODUCTION

Technology is one of the major forces influencing society today. It has revolutionized industry and is now breaking down the walls of the schools through the introduction of television, video tapes and tape recorders. Everyone is affected to some extent by changes in technology.

It is imperative, therefore, that man learn to understand the changes and the forces at work in order that he might be better able to channel them to his advantage. Industrial education provides ways, for the student through its content, organizational pattern and activities, to confront some of the technological problems inherent to our productive society.

## II. OBJECTIVES OF THE INDUSTRIAL EDUCATION PROGRAM

Industrial education has a unique place to fill in an education program that has as its objective the development of an informed citizenry in a highly industrialized society - a society that must learn to use and control the technologies. Schools must help prepare people to manage an industrial complex unknown before and to work in vocations not yet described. Industrial education is a subject area the scope of which introduces students, both boys and girls, to all aspects of productive society and has the following objectives:

### A. Personal Growth

1. To provide opportunities for the individual growth of the student through the development of acceptable personal and social values necessary in a productive society.
2. To provide a technical environment which motivates and stimulates individuals to discover their interests and develop personal and social responsibilities.
3. To assist in the development of positive attitudes towards safety.
4. To assist in the development of positive attitudes towards conservation and ecology.
5. To assist in the development of consumer values.

6. To assist in the development of positive attitudes towards the dignity of work.
7. To assist in the development of good work habits.
8. To foster the development of vocational interests and skills.

#### B. Career Exploration

To provide students with experiences which will assist them in making realistic career choices.

1. To provide students an opportunity, within a technical environment, to become acquainted with the general occupational characteristics of a variety of career fields.
2. To relate their own interests, abilities, likes, dislikes, and values to several career fields.

#### C. Occupational Skills

To developing basic competencies, integrating cognitive and psychomotor skills related to families of occupations.

1. To provide safe exploratory experiences in the use of tools, energy, equipment and materials appropriate to various technologies prevalent in a productive society.
2. To develop an understanding of the inter-relationships of various technologies.
3. To provide a technical environment which permits students to synthesize their accumulated knowledge in the solution of practical problems, and to assist the student to develop habits that will be conducive to the establishment of a safe environment.

The guide will provide specific objectives for each of the fields of study. The use of behavioral objectives is recommended but such objectives have not been included. Each teacher should prepare a set of behavioral objectives in accordance with their interests and methods of approach to the work.



### III. DEFINITION OF TERMS

The following is a definition of terms used with the industrial education program:

1. Multiple Activity Laboratory - A Laboratory where three or more activities are in progress at the same time.
2. Field of Study - The general title given to the basic technologies represented, e.g. Materials, Visual Communications.
3. Module - A module consists of from 15 to 25 hours of work in a field. There may be several modules to complete a field, e.g. Woods, Metals, Plastics, Earths in the Materials field.
4. Predesigned Products - Students at the junior high school level may not have the background or knowledge of tools and materials to design their own products. The teacher should exercise care in the designing of projects to best meet the objectives of the course.
5. Instruction Sheets - These are supplemental teaching materials which contain organized material for the use of individual students. There are four common types:
  - a) Operation Sheet - Gives directions on how to perform a single manipulative task. This would include the directions on how to operate a machine.
  - b) Job Sheet - Gives directions on how to do, completely and in proper sequence, a number of operations. The procedure for making a product or doing an experiment would constitute a job sheet.
  - c) Information Sheet - Contains everything necessary for the understanding of an instructional unit which is largely informational in nature.
  - d) Assignment Sheet - Directs the study to be done by the student on a lesson topic, and may include questions to determine how well a lesson has been learned.

6. Student Manual - The manual outlines in detail specific activities and assignments students are to do. This is a "guide" for the student to follow. It includes instructions to read specific pages in reference books, to view a filmstrip, to work out given problems and/or to outline the procedure for an activity.
7. Articulated Instructional Development Booklets (A.I.D.) - These booklets were developed to provide sequential pictorial instruction for the fabrication of products. Developed into the booklets is a Check Point System which controls both quality of the product produced and student safety.
8. Sequential Pictorial Instruction Books - These books provide a sequence of pictures that illustrate the sequential procedures to be followed in performing a specific operation or process.

#### IV. THE MULTIPLE ACTIVITY PROGRAM

The multiple activity program is an organizational device by means of which a variety of exploratory experiences can be presented with a minimum of room and equipment. The laboratory is organized into a number of different sections representing the fields of study. Each section or bay is large enough to accommodate 4 to 6 students. These bays are as self-contained as possible with provisions made for the storage of tools, products and stock within them. The class is divided into three or more groups with each group working through the course unit in the assigned bay. After the completion of the unit in from nine to twelve weeks the groups rotate, each proceeding to another bay and to new experiences.

As the units consist of from nine to twelve weeks of work, depending on the number of areas in operation, there will be several weeks unaccounted for. This time, two to four weeks, could be used at the beginning of the year to organize the activities of the groups, plan the first product for an area, teach the beginning lessons on each unit, give demonstrations and provide the information required to get each group started efficiently in their assigned unit.

Poor management and lack of planning are bound to result in confusion. Therefore, the teacher must have a well devised plan before attempting to operate a multiple activity laboratory.

## 1. Fields of Study

To provide for a breadth of exploratory experiences, the junior high school industrial education program is divided into four fields of study which are further subdivided into sixteen modules. Each module represents fifteen to twenty-five hours of study. The minimum number of modules studied in one year is three. During the junior high school years it is recommended that a student study a minimum of three different modules each year. In junior high schools where Industrial Education is taught for two years, it is recommended that four different modules per year should be studied.

### Fields of Study

#### Modules

#### Power Technology

Power Mechanics  
Electricity  
Electronics-Computer

#### Materials Technology

Earths  
Lapidary-Art Metals  
Leather-Textiles  
Metals  
Plastics  
Woods

#### Visual Communication

Graphics  
Photography-Drafting

#### Synthesizing

Consumerism  
Construction  
Manufacturing  
Student Contracting  
Developmental Research

In addition to the four fields outlined, the junior high school industrial education program includes a testing area and an instructional materials center. The testing area utilizes the materials and some of the products made in the other areas. The instructional materials center is used as a student's resource room, conference room and research area. The Developmental Research Unit is to be used for teacher research into new content only. The teacher must define the content of this unit and obtain the approval of the Provincial Consultant of Industrial Education and his principal before introducing it to the students.

## 2. Length of Program

The recommended time is from 4800 - 7000 minutes per year of 120 - 175 minutes per week in two blocks of time.

## 3. Organization of Industrial Education Laboratories

The industrial education area is designed as a multiple activity laboratory. Each school should have all the fields of instruction represented, either in one or more facilities.

Each of the work stations should be self-contained with regard to tools, machines and materials. Enough floor area should be provided to accommodate from four to six students per station.

As the laboratory work proceeds, small groups of four to six students would be found pursuing activities at three or four of the stations. Following the completion of the outlined learning experiences in a unit, the group proceeds to the next station and engages in study and activities related to it.

This system of rotation insures that each student has an introduction to all the components of the program.

A multiple activity laboratory affords each student the opportunity to observe the interdependence of technologies and to visualize the basic tools, machines and processes in each of the technologies.

## 4. Approach

The use of the product in industrial education has merit. It is to be considered a vehicle for learning. When the product becomes the focal point and ceases to be a media for this learning experience it should be re-evaluated. Carefully selected products are recommended for some of the units included in this program. The woods, metals and plastics units lend themselves well to the product method. The products, however, should be redesigned and permit a measure of successful achievement for all levels of learning. Units such as electricity, electronics, computer technology, and power mechanics lend themselves well to an experimental approach.

7

Predesigned and programmed laboratory exercises will assist in the degree of student understanding. The teacher should have available instructional materials of all types such as workbooks, A.I.D.s, films, slides and manuals. These would help him and the students organize their time efficiently. Tests and experiments will assist both in the understanding of these areas and in developing an appreciation for the scientific method.

#### 5. Suggested Organization of Teaching Modules

The number of modules presented in this guide provide for a wide range of possibilities for organizing the modules. The modules are not dependent upon any sequential development; therefore, any module could be used as an introductory module. It is recommended that the Power Technology and Visual Communications modules be covered at or near the beginning of the student's overall industrial education program. The Synthesizing modules should not be attempted until the students have had experience in the other fields of study.

#### 6. Scope of Program

The scope of the industrial education program includes the major technologies and all students, both boys and girls, should have the opportunity to explore the fields.

### V. HOW TO USE THE GUIDE

This guide is written so that teachers can more specifically relate the content to be taught to the major concepts of industrial education. Each topic is followed by a series of generalizations and concepts that the students should understand at the completion of their activities. Learning tasks are outlined to help the teacher develop the necessary learning activities in order that the students gain an understanding of the concepts and subconcepts.

Useful instructional media suggestions are listed in the last column.

The procedure for teaching the modules may vary with the teacher. However, the following guidelines will be useful to ascertain adequate coverage of the topics.

1. The module is divided into a number of topics and generalizations. The amount of time spent on each will vary with the content to be studied. The order in which the topics are covered may also vary.
2. Each generalization is circumscribed by one or two concepts. The material to be studied is selected on the basis that it will help the student understand the concept.
3. The activities are suggestive and provide direction as to types of things in which students may engage. The following are categories of activities students should experience:

Adjusting	Describing	Operating
Analyzing	Designing	Organizing
Computing	Developing	Planning
Constructing	Displaying	Processing
Controlling	Examining	Reading
Cooperating	Installing	Researching
Creating	Interpreting	Scheduling
Defining	Inventing	Studying
Demonstrating	Judging	Testing
Depicting	Observing	

4. The guide will provide a logical sequence of progression in the development of the concepts listed. The teacher will need instructional materials for student use. These include:
  - a) Manuals - outlining assignments of experiments, reading, products
  - b) Tapes - describing use of specific instruments, experiments of procedures
  - c) Loop films
  - d) Slides
  - e) Filmstrips
  - f) Charts
  - g) Models
  - h) Films
  - i) Programmed instructions

9

5. The testing and guidance portion should be developed under the topics in which the subjects may be appropriately handled.

6. Generalizations and concepts concerning related information could be covered by

- Reading
- Researching
- Films
- Tapes
- Seminars
- Discussions
- Resource people
- Tours
- Assignments
- Writing for information

7. A plan for the year should be prepared. In it the modules to be taught in each grade should be listed and a time schedule developed.

8. The teacher should have a master plan book that outlines his program for each module. It should include:

- a. An outline of how each topic is to be presented
  - demonstrations
  - student assignments
  - reading
  - experiments
  - products
  - films to view
  - tapes to hear
  - evaluation procedures
  - criteria for marking practical work such as products and experiments
  - tests and quizzes given

b) All the instructional materials given to students should be in the master book.

9. A student personnel system under the direction of the teacher should be planned to allow students to make decisions and assume responsibility.
10. A daily plan is necessary. It outlines specifically the materials to be taught to each class in advance of the lesson period. Follow-up of the period should also be noted.

#### VI. SAFETY EDUCATION PROGRAM

Each industrial education laboratory must have an effective safety program. This does not mean that the promulgation of a set of rules and regulations will satisfy this end. Students must be taught in each and every subject studied within the industrial education framework, the "hows and whys" inherent in the safety program. It is the responsibility of the teacher to supply continuous and vigilant supervision and to ensure that all students engage in only safe laboratory practices. A good safety program would include:

1. Machine guards and operating procedures approved or recommended by the Workers' Compensation Board.
2. Regular and thorough instruction and revision.
3. Constant vigilance.
4. Checking and evaluating of student safety habits by the teacher.
5. Complete first aid equipment kept in first-class condition.
6. Non-skid material and clearly marked working areas around all machinery.
7. Proper clothing, with particular attention to eye protection.
8. Machines and tools in good working condition.
9. Routine reporting and recording of all accidents.
10. Good housekeeping.



The following are samples of safety regulations which the teacher might be expected to enforce:

1. No power machines shall be used by any student before specific instruction has been given with regard to safe operation and safety precautions.
2. No power machine shall be used while the instructor is absent from the laboratory.
3. A student shall not use a machine unless it is equipped with approved guards.
4. Approved eye protection must be worn for certain operations.

NOTE: A good safety slogan which should be put into practice at all times is:  
"A PLACE FOR EVERYTHING AND EVERYTHING IN ITS PLACE" .

There are six basic steps in safety education:

1. Be familiar with Workers' Compensation Regulations.
2. Set a good safety example for students.
3. Instruct each student thoroughly in the safety precautions of his job.
4. Keep all tools sharp and in good condition.
5. Keep all safety devices in proper use.
6. Follow up safety instructions constantly. The laboratory will be as safe as the teacher makes it.

Dress and deportment play an important part in the operation of a safe program. Students and teacher should be neatly dressed at all times and the teacher should take care to ensure that no loose and dangerous clothing is worn. Safety aprons, goggles, gloves and face shields should be used wherever necessary.

Each school should receive the excellent publications and bulletins dealing with accident prevention and safety procedures distributed by the Workers' Compensation Board, Edmonton, Alberta.

NOTE: Accidents must be promptly reported to some senior school authority. If no other person is designated, this authority is the Principal.

#### VII. GENERAL INFORMATION

##### 1. Records

Every teacher should keep the following records:

- a) Attendance
- b) Daily plan (activities, demonstrations, follow-up)
- c) Phase plan for the year
- d) Record of student achievement (test marks, product rating, etc.)
- e) Inventory of equipment and supplies
- f) Student personnel system
- g) Any other records that are deemed desirable

##### 2. Student Evaluation

As the industrial education courses are exploratory, it is not logical to have students repeat modules. A profile chart should be part of the student's report to show his standing in the various units he has studied.

##### 3. Size of Classes

The organization of the physical facilities is in part determined by the original plan. There are, however, adjustments that can be made in the layout by the teacher to accommodate his/her style of teaching. The number of students in a class affects the way the lab or shop is organized. While most of the shops in Alberta are designed for 16 to 20 students, a number of factors must be considered in the final assignment of class load. These factors include:

1. physical size of the shop or laboratory
2. type of student
3. amount of equipment
4. type of programming
5. type of course
6. training and experience of the teacher

Safety of the students and their opportunity to obtain teacher contact are important considerations when class loads are determined.

#### 4. Laboratory Accommodation and Equipment

An Industrial Education Equipment List is available from the Consultant in Industrial Education, Alberta Education, Edmonton or Calgary.

#### 5. School Opening

Several days to a week should be spent at the school preparing the program prior to opening day. The following points should be checked:

- a) Examine the inventory. All tools should be repaired, sharpened and properly stored.
- b) Go over materials on hand. There should be material on hand to provide for the first rotation.
- c) Plan your year's program. Prepare a broad outline of the year's work in each grade. Have dates set for the time of rotation, when the groups change their activities.
- d) Have the lessons in each area outlined with information, job sheets, etc., available to get started.
- e) Have the products selected for each area in which they are required.
- f) Have a record system prepared.
- g) Survey product storage space and have lockers assigned by classes. Specific lockers can be given to students later.

- h) Have a general information sheet prepared for each student, outlining general laboratory procedures and rules, fees required, evaluation criteria and other information you find pertinent.
- i) If your system has a book rental scheme, make arrangements to have the initial laboratory fee collected by the book rental secretary.
- j) Have the laboratory thoroughly cleaned, painting done where needed and laboratory coats and aprons clean.
- k) Examine fire prevention equipment to see that it is functional.
- l) Develop a complete and comprehensive safety program (charts, regulations, safety zones, etc.).

#### 6. Laboratory Closing

At the end of the school year the teacher must ensure that:

- a) The inventory is checked and reported to the Principal or Secretary-Treasurer.
- b) The student's accounts are audited by a responsible authority, usually the Principal.
- c) The tools are sharpened and needed repairs are ordered.
- d) The tools are either oiled or waxed and put in a secure location.
- e) The laboratory is thoroughly cleaned and left in creditable condition.
- f) The materials that will be needed in the first quarter of the next term are ordered.
- g) An inventory of instructional materials is taken and sufficient preparation is made to get started in the fall.
- h) Rag bins and paint room supplies are checked. (Discard all soiled rags.)

- i) Batteries are removed from electronic equipment, meters, etc.
- j) Student lockers are cleaned out.

7. Provision for Custodial Services

Daily complete caretaking services are required to keep an industrial education laboratory functional and allow maximum time for instructional purposes.

VIII. COURSE CONTENT

FORMAT EXPLANATION

TOPIC: MAJOR TOPIC TO BE DEVELOPED

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
Major statements related to the topic which provide the basis for content development,	Concepts and subconcepts related to the generalizations. The concepts and subconcepts are to be considered required content.	(The student will:) Suggestions of what the student can do to develop an understanding of the concepts and subconcepts. This area should be continually updated and added to by the teacher as better ways for teaching the concepts and subconcepts become apparent.	Suggestions of resources that can be used to assist the student in developing an understanding of the generalizations, concepts and subconcepts. This area should be continually added to and updated by the teacher.



## POWER TECHNOLOGY

### INTRODUCTION

The concept of power is a large inclusive concept covering many fields, from mechanics to communication and computers. Man's ability to control energy during the past 250 years has allowed our technology to expand. Energy is all around us and our utilization of this energy can determine our future.

This section of the program is designed to create in the student a better understanding of our rapidly expanding technological society. A concept of work, energy and power should emerge through the learning tasks in which the student will engage as he/she progresses through the area.

### SPECIFIC OBJECTIVES

1. To help the student understand the many basic concepts and principles of science at work in power and relate these concepts to the vast area of power technology.
2. To gain knowledge of the utilization, transmission and control of power.
3. To familiarize the student with basic construction, operation, application, care and control of machines that convert power to useful work.
4. To develop problem-solving techniques related to machines and their operation, control, analysis and application.
5. To learn safe practices in the power technology area.

### SUGGESTED APPROACH

The modules in Power Technology are divided into several topics to provide the teacher with flexibility in designing a program for their particular area and laboratory. A minimum of three (3) topics are to be covered in each fifteen (15) hour module with an additional five (5) hours for each topic added to a maximum of twenty-five (25) for each total module.

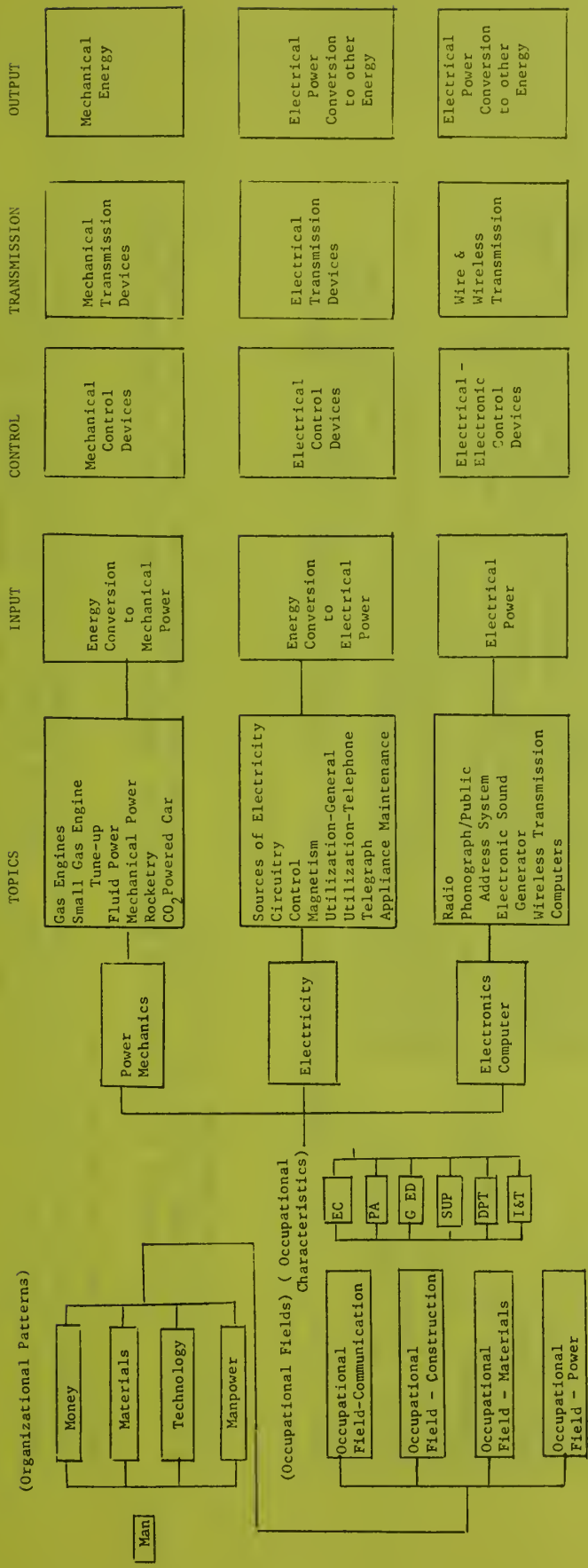
The "hands-on" approach should be utilized as much as possible. Where projects can be inexpensively fabricated, teachers should be encouraged to use them to cover the necessary concepts. Power Technology tends to be a theoretical subject and care must be taken to choose theory relevant to the student's experiences at the time.

#### SAFETY

The Power Technology area introduces to the learning environment several hazards not prominent in other areas of the lab. Special precautions must be taken to protect the students against electrical shock and burns, hazards of compressed gasses and/or liquids and excessive noise and carbon monoxide poisoning.



POWER TECHNOLOGY  
Flow Chart





## Module One

## ELECTRICITY

## Introduction

If there is one common factor which permeates every modern technology, it is the use of electricity to produce power, control, measure, or communicate. A worker in our modern world can hardly hope to function effectively without at least a rudimentary grasp of electrical principles.

This module is intended to provide the student with the experiences necessary to understand those principles. As much as possible, projects are used as the vehicle by which such information is transferred.

## References

- Bohn, Ralph C. and J. Angus MacDonald. Power: Mechanics of Energy Control. McKnight and McKnight, 1970
- Buban, Peter and others. Electricity and Electronics. McGraw-Hill of Canada, 1964
- Duffy, Joseph W. Power: Prime Mover of Technology. McKnight and McKnight, 1964
- Gerrish, Howard H. Electricity. Goodheart-Willcox, 1964
- Groneman, Chris H. and John L. Feirer. General Shop. McGraw Hill, 1969
- Lindbeck, John R. and Irvin T. Lathrop. General Industry. Chas A. Bennett, 1963
- Long, Frank J. Introductory Electricity. General Publishing (Canada), 1965
- Long, Frank J. Intermediate Electricity. General Publishing (Canada), 1965
- Shoultz, Kenneth G. Basic Electricity: Theory and Practice. MacMillan of Canada, 1965
- Alberta Education. A.I.D. Booklets. 1973\*
- Alberta Education. A.I.D. Yearbook 1974. 1974\*

---

\*Available at the School Book Branch, Alberta Education

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Electricity is a form of energy produced by movement of electrons.</p> <p>2. Electrical energy can be produced by using other forms of energy.</p>	<p>1. Theory</p> <p>2. Methods of generating.</p> <p>a. Mechanical</p> <p>b. Heat</p> <p>c. Light</p> <p>d. Chemical</p>	<p>The student will:</p> <p>a. Have a basic understanding of theory related to electron movement.</p> <p>a. Know that electricity can be produced by such means as: friction, application of pressure on a special crystal and moving a magnet past wires or visa versa.</p> <p>b. Know that heating the joint of two different metals will produce electricity.</p> <p>c. Know that light striking a special sandwich type material produces electric energy.</p> <p>d. Know that chemicals reacting on different materials can produce electricity.</p> <p>e. Produce electricity using the materials and equipment available using as many methods as possible. (Follow safe procedures)</p>	<p>BOOKS:</p> <p><u>Introductory Electricity</u></p> <p><u>Power: Prime Mover of Technology</u></p> <p><u>General Industry</u></p> <p><u>A.I.D. Booklets</u></p>

## TOPIC: CIRCUITRY

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. A complete circuit contains various components.</p> <p>2. Electricity is an energy form with measureable characteristics.</p> <p>3. Different types of circuits have different effects on amperage, voltage and resistance.</p>	<p>1. Basic circuit</p> <p>a. Components of a basic circuit</p> <p>b. Schematic</p> <p>2. Measurement</p> <p>a. Polarity</p> <p>b. Amperage</p> <p>c. Voltage</p> <p>d. Resistance</p> <p>3. Types of Circuits</p> <p>a. Series/ Parallel</p>	<p>The student will:</p> <p>a. Know that a basic circuit contains a source (input), a switch (control), wire (transmission device), and a load (output).</p> <p>b. Draw a schematic diagram of a basic circuit using appropriate symbols and connect the components following proper safe procedures.</p> <p>c. Identify the component missing in a short circuit.</p> <p>a. Know the proper safe procedure to determine polarity.</p> <p>b. Know and use the proper safe procedures for measuring amperage.</p> <p>c. Know and use the proper safe procedures for measuring voltage.</p> <p>d. Know and use the proper safe procedures for measuring resistance.</p> <p>a. Experiment with various series and parallel circuits to compare amperage, voltage and resistance and record the results on schematic diagrams.</p>	<p>BOOKS:</p> <p><u>Electricity and Electronics</u></p> <p><u>Electricity</u></p> <p><u>Intermediate Electricity</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. For effective use of electrical energy, it is necessary to be able to turn the energy on and off.</p> <p>2. Electrical circuits have to be protected from excessive use.</p> <p>3. It is often necessary to reverse the direction of flow or limit the flow of electricity in one direction.</p> <p>4. The amount of electron flow in a circuit can be controlled.</p>	<p>1. On-off switching</p> <p>a. Manual</p> <p>b. Electro-magnetic switches</p> <p>c. Transistors</p> <p>2. Overload control</p> <p>a. Fuses</p> <p>b. Circuit breakers</p> <p>3. Directional control</p> <p>a. Manual Switches</p> <p>b. Diodes/S.C.R.</p> <p>4. Control of the amount of electron flow</p> <p>a. Resistors</p> <p>b. Transformers</p>	<p>The student will:</p> <p>a. Experiment with various types of manual on-off switches.</p> <p>b. Experiment with electro-magnetic switches used in alarm systems etc.</p> <p>c. Know that transistors provide on-off switching in the same manner as a relay.</p> <p>a. Understand the basic principle of the operation of a fuse.</p> <p>b. Understand the basic principle of the operation of a circuit breaker.</p> <p>a. Experiment with D.P.D.T. switches to indicate the reversal in direction of the flow of electrons.</p> <p>b. Experiment with diodes and/or S.C.R.'s to illustrate operations of the components.</p> <p>a. Experiment with fixed and variable resistors to demonstrate the effect on current flow.</p> <p>b. Have a basic understanding of the use of transformers.</p>	<p>BOOKS:</p> <p><u>Power: Mechanics of Energy Control</u></p> <p><u>Electricity and Electronics</u></p> <p><u>A.I.D. Booklets</u></p>

## TOPIC: MAGNETISM

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<ol style="list-style-type: none"> <li>1. Magnets contain certain properties which can be useful in the field of electricity.</li> <li>2. Electricity can produce a magnetic field.</li> <li>3. Electro-magnetism can be used to do work.</li> </ol>	<ol style="list-style-type: none"> <li>1. Magnets               <ol style="list-style-type: none"> <li>a. Magnetic field</li> </ol> </li> <li>2. Electro-magnetism</li> <li>3. Uses               <ol style="list-style-type: none"> <li>a. Solenoid</li> <li>b. Electro-Magnets</li> <li>c. Motors</li> </ol> </li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Experiment with magnets to determine the characteristics of magnetic lines of force.</li> <li>a. Understand the basic principles of electro-magnetism.</li> <li>a. Understand the basic principle of solenoids and identify several uses for it.</li> <li>b. Understand the basic principles of an electro-magnet and identify several uses for it.</li> <li>c. Understand the basic operating principles of simple electric motors.</li> <li>d. Experiment with electro-magnetism to gain an understanding of the operation of door chimes, bells, buzzers and relays.</li> <li>e. Build a product using available materials that would demonstrate a basic understanding of electro-magnetism.</li> </ol>	<p>BOOKS:</p> <p><u>Electricity and Electronics</u></p> <p><u>Electricity</u></p> <p><u>General Indus-try</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. The uses of electricity are dependent upon our ability to convert it into other forms of energy which can be used to do tasks for mankind.</p>	<p>1. Electrical energy converts to:</p> <ul style="list-style-type: none"> <li>a. Mechanical</li> <li>b. Heat</li> <li>c. Light</li> <li>d. Chemical</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Experiment with ways in which electricity is used to produce mechanical energy and list several applications of the mechanical energy produced.</li> <li>b. Understand the basic principle of converting electrical energy into heat and list several applications of the heat energy produced.</li> <li>c. Understand the basic principles of converting electrical energy into light.</li> <li>d. Understand the basic principle used for electro-plating and/or electrolysis of water.</li> <li>e. Build a small product that will demonstrate the conversion of electricity into another form of energy and explain its operation.</li> </ul>	<p>BOOKS:</p> <p><u>General Industry</u> <u>Power:Mechanics of Energy Control</u> <u>Electricity and Electronics</u></p>



Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Electrical energy can be used to produce sound at great distances from the source by the use of wires to transmit the signals.</p>	<p>1. Conversion of electrical energy into sound</p> <p>a. Telephone</p> <p>b. Telegraph</p>	<p>The student will:</p> <p>a. Understand the basic operation of the telephone.</p> <p>b. Understand the basic operation of a telegraph.</p> <p>c. Set up a telephone circuit.</p> <p>d. Build a Morse code sender or similar product.</p>	<p>BOOKS:</p> <p><u>General Shop</u></p> <p><u>General Industry</u></p> <p><u>Electricity and Electronics</u></p>

## TOPIC: APPLIANCE MAINTENANCE

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<ol style="list-style-type: none"> <li>1. During the servicing of electrical appliances, it is necessary to recognize hazards and to avoid them.</li> <li>2. The knowledge gained about electricity can be utilized by students during servicing and maintaining electrical equipment inside the home.</li> </ol>	<ol style="list-style-type: none"> <li>1. Safety</li> <li>2. Trouble shooting</li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Understand the importance for proper safe procedures while servicing electrical appliances</li> <li>b. Inspect the lab and home for any unsafe electrical conditions with regards to power appliances and the wiring.</li> <li>a. Perform several "Trouble-shooting" exercises used to detect defects in the appliances.</li> <li>b. Identify the repairs necessary to correct the malfunctioning appliance.</li> <li>c. Effect the repair of the malfunctioning appliances. (Optional)</li> </ol>	<p>BOOKS: <u>General Shop</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>1. Occupational information</p> <ul style="list-style-type: none"> <li>a. High school programs</li> <li>b. Career opportunities</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Know what high school programs are available in the related career fields.</li> <li>b. Identify several occupations in the related career fields and become aware of the educational requirements.</li> <li>c. Visit open house at various high schools. (Optional)</li> <li>d. Go on field trips. (Optional)</li> </ul>	<p>PAMPHLETS:</p> <p>Check with Counselling and Guidance office</p>



## Module Two

## ELECTRONICS/COMPUTER

## Introduction

We live in an electronic society which is being controlled by computers. A basic understanding of the field of electronics will enable the students to better understand the environment in which they find themselves. The use of the product as a vehicle of learning may be impractical because of the cost of electronic components.

## References

- Burber, Peter and others. Electricity and Electronics. Toronto: McGraw-Hill (Canada), 1964
- Lohberg, Rolf and Theo Lutz. Computers at Work. New York: Sterling Publishing, 1970
- Loper, O.E. and A.F. Ahr. Introduction to Electricity and Electronics. Weston, Ontario: Delmar Publishers, 1968
- Lux, Donald G., and Willis E. Ray. World of Manufacturing. McKnight & McKnight, 1971.
- Lux, Donald G., and Willis E. Ray. World of Manufacturing: Laboratory Manual. McKnight and McKnight, 1971
- Meadow, Charles T. The Story of Computers. New York: Harvey House, 1970
- Rusih, Richard B. Computers: Their History and How They Work. New York: Simon and Schuster, 1969
- Waning, R.H. Making Transistor Radios: A Beginner's Guide. London: Letterworth Press, 1971.

TOPIC: COMPONENT FUNCTIONS

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Electrical components have unique physical and electrical characteristics which enable them to perform specific functions.</p> <p>2. Colour coding is very important in electronic systems.</p>	<p>1. Components</p> <ul style="list-style-type: none"> <li>- resistors</li> <li>- capacitors</li> <li>- transistor</li> <li>- diodes</li> <li>- etc.</li> </ul> <p>2. Color coding</p>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Know the basic purpose and the operation of each of the components studied.</li> <li>a. Review the colour coding used for fixed resistors, capacitors, etc.</li> <li>b. Refer to chassis wiring colour code while examining the chassis wiring of a radio and/or T.V. set.</li> <li>c. A basic understanding of the purpose and need for colour coding.</li> <li>d. Complete several exercises related to colour coding.</li> </ol>	<p>BOOKS:</p> <p><u>Electricity and Electronics</u></p>

## TOPIC: ELECTRONIC SOUND GENERATION

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Electrical components have unique physical and electrical characteristics which can be utilized in production of electronic sound.</p>	<p>1. Oscillator circuit components</p> <ul style="list-style-type: none"> <li>- transistors</li> <li>- resistors</li> <li>- capacitors</li> <li>- potentiometer</li> </ul>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Have a knowledge of the type of components used.</li> <li>b. Connect various circuits on prepared kits to produce various sounds such as an electronic bird, organ, sound effect generators, etc.</li> <li>c. Draw block diagrams and/or schematic diagrams of the circuits connected.</li> <li>d. Produce a simple product that produces electronic sound. (Optional)</li> </ol>	<p>LABORATORY MANUALS Consult lab manuals for electronic kits</p>

## TOPIC: WIRELESS TRANSMISSION

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Generally, the operation of transmission devices is controlled by government regulations.</p> <p>2. Wireless transmission devices are used in the communication industry.</p>	<p>1. Regulations</p> <p>2. Communications</p> <p>a. Data transmission</p> <p>b. Operation of transmission devices</p>	<p>The student will:</p> <p>a. Review the regulations concerning wireless transmission devices such as walkie-talkies, citizen band radios, ham radios, etc.</p> <p>b. Know the regulations governing the wireless transmission devices used in the lab.</p> <p>a. Use a tape-recorder at low speed to record a message. Then play it back at high speed to illustrate how the telephone system is used for high speed data transmission.</p> <p>b. Use walkie-talkies and/or citizen band radios to transmit messages, following all regulations governing the operation of the equipment.</p> <p style="text-align: center;">AND/OR</p> <p>Connect various wireless transmission circuits found in prepared electronic experimental kits.</p>	



Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Information or data is placed on cards which are read by the computer.</p> <p>2. The electronic computer is composed of several different components.</p> <p>3. The computer is controlled by a programmer, who prepares information for the computers.</p>	<p>1. Punch cards</p> <p>2. Computer components.</p> <p>a. Input</p> <p>b. Central Processing Unit</p> <p>c. Output</p> <p>3. Programming</p> <p>a. Languages</p> <p>b. Flow charts</p>	<p>The student will:</p> <p>a. Have a basic understanding of the coding used on punch cards.</p> <p>b. Know that information can be placed on the cards manually on special cards or punched by machine called a key punch.</p> <p>c. Place some information manually onto a special pre-perforated card called Port-a-Punch cards.</p> <p>a. Know several ways that information is put into the computer.</p> <p>b. Have a basic understanding of the functions of the various sections of the Central Processing Unit.</p> <p>c. Know several ways that the processed data or information is prepared for use by man.</p> <p>a. Review several different computer languages used today.</p> <p>b. Use proper symbols to prepare flow charts for simple problems</p> <p>c. Solve simple arithmetic problems on a computer.</p>	<p>BOOKS:</p> <p><u>The World of Manufacturing</u></p> <p><u>The World of Manufacturing Laboratory Manual</u></p> <p><u>Computers at Work</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. The historical development of the radio can provide interesting information.</p> <p>2. Several types of radio receivers are used today.</p> <p>3. Radio receivers have several systems which make up the total unit.</p>	<p>1. History</p> <p>2. Radio receivers</p> <ul style="list-style-type: none"> <li>- A.M.</li> <li>- F.M.</li> <li>- Shortwave</li> </ul> <p>3. Systems</p> <ul style="list-style-type: none"> <li>a. Detector</li> <li>b. Tuner</li> <li>c. Filter</li> <li>d. Amplification</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Be able to relate some of the major developments in the early developments of the radio.</li> <li>a. Have a basic understanding of the different types of radios.</li> <li>a. Have a basic understanding of how the detector demodulates radio waves.</li> <li>b. Have a basic understanding of how the tuner separates different radio stations.</li> <li>c. Know that several components are used to remove unwanted noise.</li> <li>d. Know that the weak signal is increased in strength so that the sounds can be heard through speakers.</li> <li>e. Connect a radio system and draw a block diagram of the system.</li> <li>f. Perform several experiments to help clarify the various concepts using available equipment, following proper safe procedures.</li> </ul>	<p>BOOKS:</p> <p><u>Electricity and Electronics</u></p> <p><u>Making Transistor Radios: A Beginner's Guide</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<ol style="list-style-type: none"> <li>1. The historical development of the phonograph can provide interesting information.</li> <li>2. Sound waves and impressions</li> </ol>	<ol style="list-style-type: none"> <li>1. History</li> <li>2. Sound waves               <ol style="list-style-type: none"> <li>a. Production</li> <li>b. Amplification</li> </ol> </li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Be able to relate some of the major developments in the early history of the phonograph.</li> <li>a. Understand the piezoelectric effect as related to its use in the phonograph.</li> <li>b. Have a basic understanding of the amplification of the signal to produce a louder sound.</li> <li>c. Operate the system and control loudness and tone.</li> <li>d. Draw a block diagram of the system.</li> <li>e. Examine different types of records under a microscope and relate the difference in terms of different types of phonographs.</li> <li>f. Perform several experiments to help clarify the various concepts, using available equipment and following proper safe procedures.</li> </ol>	<p>BOOKS:</p> <p><u>Electricity and Electronics</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>1. Occupational information</p> <p>a. High school programs</p> <p>b. Career opportunities</p>	<p>The student will:</p> <p>a. Know what high school programs are available in the related career fields.</p> <p>b. Identify several occupations in the related career fields and become aware of the educational requirements.</p> <p>c. Visit open house at various high schools. (Optional)</p> <p>d. Go on field trips. (Optional)</p>	<p>PAMPHLETS:</p> <p>Check with the Counselling and Guidance Office</p>

POWER MECHANICS

Introduction

The Power Mechanics module is designed to provide the students with experiences which they can relate quite readily to everyday life. The gas engine is a very important part of our daily living and a basic understanding of its operation and care is an asset to the student. The mechanical and fluid transmission, control and output can be related to everyday experiences.

References

- Bohn, Ralph C. and Angus J. MacDonald. Power: Mechanics of Energy Control. McKnight and MdKnight, 1970
- Davis, Ewart J. and P.H.Attebetty. Power Mechanics. General Publishing, 1964
- Duffy, Joseph W. Power: Prime Mover of Technology. McKnight and McKnight, 1969
- Lowry, Peter and Field Griffith. Model Rocketry: Hobby of Tomorrow. Doubleday, 1972
- Purvis, Jud. All About Small Gas Engines. Goodheart - Willcox, 1963
- Saltrick, Daniel F. and Alfred M.Kubota. Aerospace Education and Model Rocketry. Box 227, Penrose, Colo.: Estes Industries, 1970
- Stine, George H. The Model Rocketry Manual. New York: Sentinel Books, 1970
- Worthington, Robert M. and others. General Power Mechanics. McGraw-Hill, 1968
- Alberta Education. A.I.D. BOOKLETS. 1973\*
- Alberta Education. A.I.D. YEARBOOK 1974. 1974\*

\* "Model Rocketry in Canada". Penrose, Colo.: Estes Industries.

\* Available at School Book Branch, Alberta Education

## TOPIC: SMALL GAS ENGINES

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Small gas engines of various types are used in the home or yard and in industry to do various tasks for man.</p> <p>2. Disassembly of a small gas engine enables a close examination of the various systems found in large engines.</p> <p>3. Proper procedures are very important in assembling an engine to ensure proper operation when completed.</p> <p>4. Proper procedure for running an engine ensures safe operation and longer life of the engine.</p>	<p>1. Identification of type</p> <p>a. Two stroke cycle engine</p> <p>b. Four stroke cycle engine</p> <p>c. Rotary</p> <p>2. Disassembly</p> <p>3. Assembly</p> <p>4. Running/Analysis</p>	<p>The student will:</p> <p>a. Examine a two stroke cycle engine and/or model and identify the basic operating principle.</p> <p>b. Examine a four stroke cycle engine and/or model and identify the basic operating principle.</p> <p>c. Examine a rotary engine and/or model and identify the basic operating principle.</p> <p>a. Disassemble an engine to examine the air/fuel carburetor system, cooling system, ignition system, and lubricating system.</p> <p>b. Be able to identify the major components of each system.</p> <p>a. Assemble an engine using proper tools and following proper safe procedures.</p> <p>a. Know the hazards of flammables, carbon monoxide gas, engine noise and excessive R.R.M's</p> <p>b. Know and use proper safe procedures for starting, running and stopping the engine.</p>	<p>BOOKS:</p> <p><u>Power: Prime Mover of Technology</u></p> <p><u>All About Small Gas Engines</u></p> <p>A.I.D. Booklets</p> <p>FILMS:</p> <p><u>A.B.C's of the Internal Combustion Engine (General Motors)</u></p> <p><u>The Two Stroke Cycle Engine (Shell Oil)</u></p>

TOPIC: SMALL GAS ENGINES (CONTINUED)

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
		<p>The student will:</p> <ul style="list-style-type: none"> <li>c. Display knowledge of proper engine storing procedures.</li> <li>d. Analyze the power output of the engine using available equipment and following proper safe procedures. (Optional)</li> </ul>	

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<ol style="list-style-type: none"> <li>1. Keeping an engine running properly is valuable to anyone with a gas engine, large or small.</li> <li>2. Minor tune-ups can improve the performance of the engine and reduce air pollution.</li> </ol>	<ol style="list-style-type: none"> <li>1. Trouble shooting</li> <li>2. Replacing tune-up parts</li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Use proper trouble shooting techniques to determine why an engine will not start, run properly, etc.</li> <li>a. Know proper procedures to identify the engine and to order replacement tune-up parts.</li> <li>b. Know how to locate the various sections of operations manual to determine specification and adjustment procedures.</li> <li>c. Replace defective tune-up parts and make all necessary adjustments.</li> <li>d. Start the engine, using proper safe procedures and make final adjustments to the air/fuel mixture.</li> </ol>	<p>BOOKS:</p> <p>Power: Mechanics of Energy Control</p> <p>All About Small Gas Engines</p>



Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<ol style="list-style-type: none"> <li>1. The successful completion of a product depends upon good design.</li> <li>2. Manufacturing the car requires various processes of separating and combining materials.</li> <li>3. Testing the CO<sub>2</sub> power car brings out several concepts and principles.</li> </ol>	<ol style="list-style-type: none"> <li>1. Product planning               <ol style="list-style-type: none"> <li>a. Specifications</li> <li>b. Drawing</li> </ol> </li> <li>2. Manufacturing the car               <ol style="list-style-type: none"> <li>a. Separating materials</li> <li>b. Combining materials</li> </ol> </li> <li>3. Testing               <ol style="list-style-type: none"> <li>a. Roll testing</li> <li>b. Racing</li> </ol> </li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Know the required specifications for the design of the car.</li> <li>b. Produce a full scale drawing of the car on prepared paper.</li> <li>a. Use the proper separating tools to manufacture the car, following proper safe procedures.</li> <li>b. Use the proper combining processes to manufacture the car, following proper safe procedures.</li> <li>a. Perform comparative roll tests to determine which car rolls the furthest off a ramp.</li> <li>b. Race the CO<sub>2</sub> power car, following proper safe procedure to determine the fastest car.</li> <li>c. Calculate the actual speed and scaled speed in M.P.H.</li> <li>d. Test the CO<sub>2</sub> cartridge for the power output. (Optional)</li> </ol>	<p>BOOKS:</p> <p><u>The World of Manufacturing: Laboratory Manual</u></p> <p>A.I.D. Yearbook, 1974</p>

## TOPIC: MODEL ROCKETRY

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Model rocketry can be a very rewarding experience if proper safety precautions are followed.</p> <p>2. A properly designed rocket will perform most successfully.</p>	<p>1. Model rocketry safety code</p> <p>2. Product planning</p> <p>a. Design</p>	<p>The student will:</p> <p>a. Read and follow the safety code for each stage of development of the model rocket.</p> <p>a. Design a model rocket with an appropriate recovery system, using the information on design available.</p>	<p>BOOKLETS: <u>Model Rocketry in Canada</u></p> <p><u>Aerospace Education and Model Rocketry</u></p>
<p>3. Care should be taken during the construction and finishing of the rocket to insure a successful performance.</p>	<p>3. Manufacturing the rocket</p> <p>a. Procedures</p> <p>b. Stability testing</p> <p>c. Preparation for launch</p>	<p>a. Follow proper safe procedures to manufacture the model rocket.</p> <p>b. Perform a stability test and stabilize the model rocket if necessary.</p> <p>c. Prepare the model rocket for launch, using proper materials and procedures.</p>	<p>BOOKS: <u>Model Rocketry: Hobby of Tomorrow</u> <u>Model Rocketry Manual</u></p>
<p>4. Several concepts and principles are used in launching and testing model rockets.</p>	<p>4. Launching</p> <p>a. Engine operation</p> <p>b. Ignition system</p>	<p>a. Know the basic operation of a model rocket engine.</p> <p>b. Know the basic principle of igniting a model rocket engine, following proper safe procedures.</p> <p>c. Launch the model rocket and calculate the altitude attained.</p> <p>d. Perform other comparative tests such as flight duration, etc.</p>	

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<ol style="list-style-type: none"> <li>1. Energy in various forms is used any time that light, heat or motion is present.</li> <li>2. Power or energy has to be applied before work can be done</li> <li>3. Through his ability to control energy, man has been able to advance technologically.</li> <li>4. Power has to be transmitted from one place to another in order to be more effective.</li> </ol>	<ol style="list-style-type: none"> <li>1. Forms of energy</li> <li>2. Input</li> <li>3. Control devices                             <ol style="list-style-type: none"> <li>a. Values</li> </ol> </li> <li>4. Transmission devices</li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Identify the various forms of energy and illustrate several ways in which each form of energy is used.</li> <li>a. Understand that liquids or gases placed under pressure can produce a force which can be applied to do work.</li> <li>b. Identify the method used to place the gas or liquid under pressure in the lab.</li> <li>a. Identify the various types of values used to control fluids and indicate the types of control produced.</li> <li>b. Experiment with the various control devices to gain a better understanding of their application.</li> <li>c. Examine the equipment in the lab and/or home and identify the control devices used.</li> <li>a. Understand that fluids are transmitted mainly using rigid pipes or flexible tubing.</li> <li>b. Identify several methods used to make connections that will prevent fluids from escaping.</li> </ol>	<p>BOOK: Power: Mechanics of Energy Control</p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>5. Power or energy can be used to do useful work.</p>	<p>5. Output</p> <ul style="list-style-type: none"> <li>a. Fluid motors</li> <li>b. Cylinders</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Understand the operation of fluid motors and list several applications of them.</li> <li>b. Conduct various experiments using cylinders to gain a basic understanding of their application.</li> <li>c. Know that the usual output of fluidic system is mechanical power.</li> </ul>	

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<ol style="list-style-type: none"> <li>1. Energy in various forms is used any time that light, heat or motion is present.</li> <li>2. Power or energy has to be applied before work can be done.</li> <li>3. Through his ability to control energy, man has been able to advance technologically.</li> </ol>	<ol style="list-style-type: none"> <li>1. Forms of energy</li> <li>2. Input</li> <li>3. Control devices                             <ol style="list-style-type: none"> <li>a. Simple/Compound machines</li> <li>b. Gears</li> <li>c. Clutches</li> </ol> </li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Identify the various forms of energy and illustrate several ways in which each form of energy is used.</li> <li>a. Identify various forms of energy or power used as a source to start mechanical equipment.</li> <li>a. Identify simple machines such as the lever, etc., and gain a basic understanding as to how they are used to control energy.</li> <li>b. Identify several types of gears and be able to indicate the type of control gears can produce.</li> <li>c. Identify several applications of the clutch and indicate the type of control produced.</li> <li>d. Experiment with the various control devices to gain a better understanding of their application.</li> <li>e. Examine the equipment in the lab and/or in the home and identify the mechanical control devices used.</li> </ol>	<p>BOOKS:</p> <p>Power: <u>Mechanics of Energy Control</u></p> <p>Power: <u>Prime Mover of Technology</u></p>

## TOPIC: MECHANICAL POWER (Continued)

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>4. Power has to be transmitted from one place to another in order to be more effective.</p>	<p>4. Transmission devices</p>	<p>The student will:</p> <ol style="list-style-type: none"> <li>Have a basic understanding of the fact that control devices such as gears, etc., can also be transmission devices.</li> <li>Identify the transmission devices such as solid shafts, cables, chains, belts, etc.</li> <li>Experiment with various transmission devices.</li> <li>Examine the equipment in the lab and/or in the home and identify the mechanical transmission devices used.</li> </ol>	
<p>5. Power or energy can be used to do useful work.</p>	<p>5. Output</p>	<ol style="list-style-type: none"> <li>Know that the actual work being done as in mowing a lawn is the output of the mechanical systems.</li> <li>Know that the output of the mechanical system could be a change in the form of energy (i.e. mechanical to electrical).</li> </ol>	

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>1. Occupational information</p> <ol style="list-style-type: none"> <li>a. High school programs</li> <li>b. Career opportunities</li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Know what high school programs are available in the related career fields.</li> <li>b. Identify several occupations in the related career field and become aware of the educational requirements.</li> <li>c. Visit open house at various high schools. (Optional)</li> <li>d. Go on field trips. (Optional)</li> </ol>	<p>PAMPHLETS: Check with Counselling and Guidance Office.</p>





# MATERIALS TECHNOLOGY

## Introduction

The materials technology area is a very large component of our highly industrial society. The student should become aware of the various materials used through involvement with materials testing and fabrication. This field should bring the student into contact with the more common materials, tools, equipment and processes as used by industry. Through this exposure it is hoped that the students will better understand the world in which they find themselves. A study of occupations related to materials modules will reveal the wide scope of this field. There are careers in this field which have not yet been defined but which are certain to evolve in the very near future.

## Specific Objectives

1. To provide the student with an opportunity to discover special aptitudes in the kinesthetic area.
2. To provide the student with an opportunity to learn to use tools and machines correctly and to develop positive safety attitudes.
3. To foster in the students an appreciation of high standards of workmanship and of the dignity of work.
4. To give the student an insight into the career opportunities in the related career fields in industry.
5. To familiarize the student with the fundamental material processes used in industry through the following of proper safe fabrication procedures.
6. To demonstrate the interrelationship of the various materials technologies.

### Suggested Approach

Due to the complexity and variety of the materials field, a student can not have experience in all of the basic processes and operations involved. Therefore, the emphasis in the materials field should be placed on developing and understanding of the major concepts that are prevalent in industry. This objective may be achieved by exposing the student to as many materials and processes as possible.

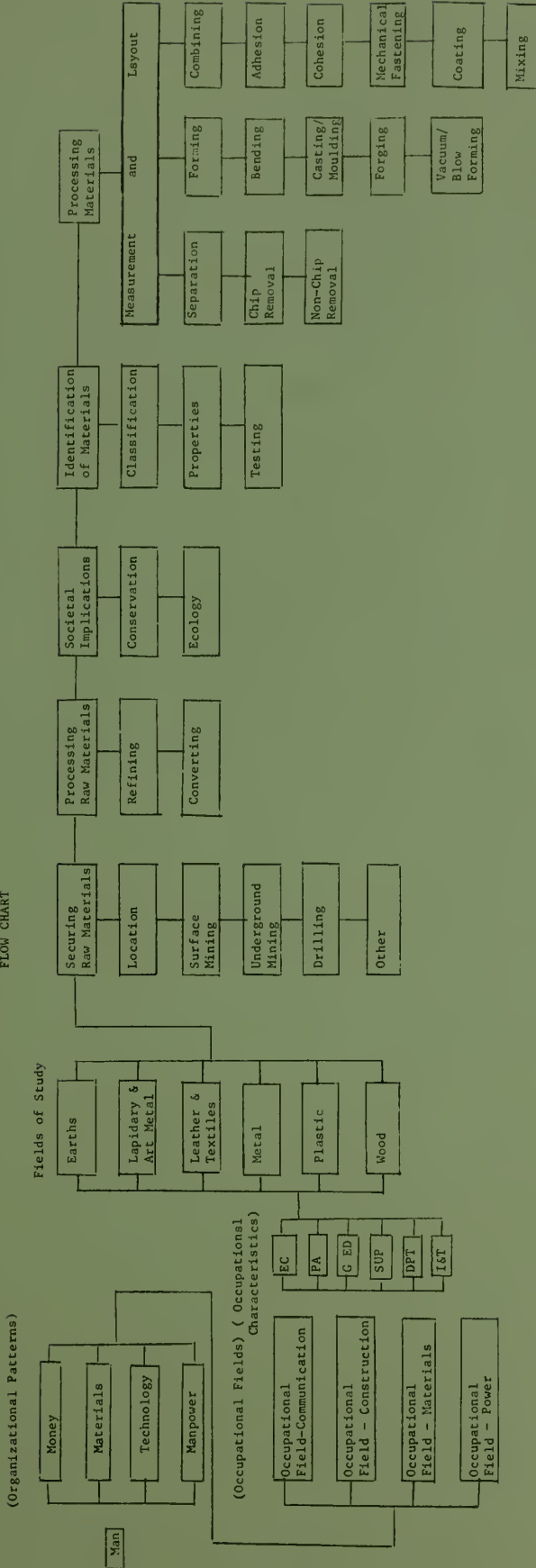
While the product is still an important vehicle for student motivation and process development, care must be taken to insure that product development is used to emphasize concept development. It is hoped that through careful selection and designing of products produced in the laboratories, the students will be exposed to as many tools and machines as possible in order that they may experience the industrial processes first hand.

The pattern of course development should illustrate the commonalities of the processes related to the different materials as well as illustrate the uniqueness of the procedures in particular areas. How far one can develop these concepts depends upon the materials, tools, equipment, laboratory space available and the imagination and initiative of the teacher. After the completion of the materials technologies program, the student should have developed a comprehension of the concepts of materials and their place in our industrial society.

### Safety

The laboratory organized for multiple activity must have an effective safety program. Machines must have adequate guards, students must be properly clothed for their work, and thorough instruction in the use of ALL hand and power tools is of utmost importance. No machine should be student operated until complete instructions and demonstrations have been presented by the teacher. It is not recommended that the student operate the table saw or any other machine that the teacher feels the student could not handle safely.

MATERIALS TECHNOLOGY  
FLOW CHART





EARTHS TECHNOLOGY

Introduction

The area of earths technology incorporates several materials which have been converted into the form of plass, concrete, clay, plaster and abrasives. The student should become familiar with the basic processes of these materials through practical work. It should be explained that emphasis should not be placed upon the art/craft approach, but rather upon industrial concepts and good design principles.

References

- Elliott, Patricia and S. Lule-Smythe. Glass. Don Mills, Ontario: Burns and MacEachern, 1965
- Gronenan, Chris H. and John L. Feirer. General Industrial Education. McGraw-Hill, 1974
- Lindbeck John R. and Irvin T. Lathrop. General Industry. Chas A. Bennett, 1969
- Lux, Donald G. and Willis E. Ray. World of Manufacturing. McKnight and McKnight, 1971
- Nelson, Glenn C. Ceramics. Holt, Rinehart and Winston, 1966
- Pringle, Laurence. Recycling Resources. New York: MacMillan, 1974
- Alberta Education. A.I.D. BOOKLETS. 1973\*
- Alberta Education. A.I.D. YEARBOOK. 1974\*

---

\*Available at the School Book Branch, Alberta Education

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. The development and effective utilization of a nation's resources is necessary for a productive society.</p> <p>2. Raw materials must be processed in order to provide standard size and quality material which can be used for manufacturing useful components or products.</p> <p>3. The procurement and processing of material resources has various implications upon our society.</p> <p>4. Selection of the proper material for the product and testing the material are very important functions of industry.</p>	<p>1. Sources</p> <p>a. Location</p> <p>b. Extraction</p> <p>2. Processing</p> <p>a. Refining/ Converting</p> <p>3. Societal implications</p> <p>a. Conservation</p> <p>b. Ecology</p> <p>4. Identification</p> <p>a. Properties</p>	<p>The student will:</p> <p>a. Know the raw materials for concrete and ceramic materials, and be able to locate on a map of Alberta some of the major locations of the raw materials.</p> <p>b. Know that the main raw materials are extracted by surface or underground mining.</p> <p>a. Identify the main processes in refining and converting the raw materials.</p> <p>b. Know that silica sand and other refined raw materials are converted into glass.</p> <p>a. Have a basic understanding of the need for conservation and recycling.</p> <p>b. Know some of the effects upon the ecology.</p> <p>a. Know the basic properties of the materials used in product development.</p>	<p>TAPES: V.T.R./V.C.R. if available</p> <p>BOOKS: <u>Glass</u> <u>Ceramics</u></p> <p>BOOK: <u>Recycling</u> <u>Resources</u></p> <p>BOOKS: <u>Glass</u> <u>Ceramics</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>5. The successful completion of a product depends upon design and accurate layout and measurement.</p> <p>6. During the process of manufacturing products or components, materials have to be separated.</p>	<p>5. Product planning</p> <ul style="list-style-type: none"> <li>a. Design principles</li> <li>b. Measurement systems                             <ul style="list-style-type: none"> <li>- English</li> <li>- Metric</li> </ul> </li> <li>c. Layout and measurement tools</li> </ul> <p>6. Separation processes</p> <ul style="list-style-type: none"> <li>a. Chip removal</li> <li>b. Non-chip removal</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>b. Perform simple tests on the materials used to determine hardness, flexibility, etc. (Follow proper safe procedures)</li> <li>a. Become familiar with the design principles and be able to interpret simple technical drawings.</li> <li>b. Use both systems of measurement in product development.</li> <li>c. Become familiar with and handle measurement and layout tools satisfactorily.</li> <li>a. Identify and use chip removal separating tools and equipment following proper safe procedures.</li> <li>b. Identify and use non-chip removal separating tools and equipment following proper safe procedures.</li> <li>c. Have a basic understanding of and use the process of induced fracture for separating glass.</li> <li>d. Have a basic understanding of and use the process of jiggering in product development. (Optional)</li> </ul>	<p>BOOK: <u>General Shop</u></p> <p>BOOK: <u>General Industry</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>7. During the manufacturing of products or components, materials can be shaped without adding or removing material.</p>	<p>7. Forming processes</p> <ul style="list-style-type: none"> <li>a. Bending</li> <li>b. Casting/ Moulding</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Bend the materials available in the earths area following proper safety procedures.</li> <li>b. Cast products using the materials available in the earth area, following proper safety procedures.</li> <li>c. Extrude clay or other material available through a simple device such as a cake icing plunger to demonstrate a basic understanding of the extruding process.</li> </ul>	<p>BOOK: <u>General Industry</u></p>
<p>8. During the manufacturing of products or components, it may be necessary to change the properties of the material.</p>	<p>8. Conditioning processes</p> <ul style="list-style-type: none"> <li>a. Heat</li> <li>b. Moisture</li> </ul>	<ul style="list-style-type: none"> <li>a. Know and use the proper safe procedures to heat glass and ceramic products.</li> <li>b. Know and use the proper safe procedures for conditioning materials with moisture.</li> </ul>	<p>BOOKS: <u>Ceramics</u> <u>Glass</u></p>
<p>9. Materials of similar and different properties and composition can be combined to produce useful, durable and aesthetic products.</p>	<p>9. Combining processes</p> <ul style="list-style-type: none"> <li>a. Adhesion</li> </ul>	<ul style="list-style-type: none"> <li>a. Identify and use the proper adhesive for the type of materials to be bonded together</li> </ul>	<p>BOOKS: <u>General Industry</u> <u>World of Manufacturing</u></p>



Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>10. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>b. Cohesion</p> <p>c. Coating</p> <p>d. Mechanical fasteners</p> <p>e. Mixing</p> <p>10. Occupational information</p> <p>a. High school programs</p> <p>b. Career opportunities</p>	<p>The student will:</p> <p>b. Identify and use the proper safety procedures necessary for cohesion bonding of the materials used.</p> <p>c. Identify and use the coating procedures available following proper safe procedures.</p> <p>d. Identify and use the proper mechanical fasteners available.</p> <p>e. Know and use the proper mixing processes following safety procedures.</p> <p>a. Know what high school programs are available in the related career fields.</p> <p>b. Identify several occupations in the related career fields and become aware of the educational requirements.</p> <p>c. Visit open house at various high schools. (Optional)</p> <p>d. Go on field trips. (Optional)</p>	<p>PAMPHLETS: Check with Counselling and Guidance Offices</p>



## Module Two

### LAPIDARY AND ART METALS TECHNOLOGY

#### Introduction

The Lapidary and Art Metal area includes a wide range of materials and processes. A teacher can use the area to demonstrate several complicated processes such as chemical separation, the combining of metal and a ceramic material, etc. The area of Lapidary and Art Metals does have a tendency to become more associated with the art/craft approach; however, if the industrial processes are emphasized, good design principles can also be taught.

#### References

- Bridge, Paul and Austin Crossland. Designs in Metals. Great Britain: B. T. Batsford, 1966
- Coleman, Gerry and others. Copper Enameling. California: Arts and Crafts, 1957
- Di Valentin, Maria. Practical Encyclopedia of Crafts. New York: Sterling Publishing, 1972
- Feirer, John L. General Metals. McGraw Hill, 1967
- Gentille, Thomas. Step-by-Step Jewelry. New York: Golden Press, 1968
- Groneman, Chris, H. and John L. Feirer. General Shop. McGraw Hill, 1969
- Siegner, Vernon C. Art Metals. Chicago: Goodheart-Willcox, 1961
- Walls, A.W., and R. Nay. An Introduction to Creative Metal Work. London: Edward Arnold, 1971

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. The development and effective utilization of a nation's resources is necessary for a productive society.</p>	<p>1. Sources</p> <p>a. Location</p> <p>b. Extraction</p>	<p>The student will:</p> <p>a. Know the main raw materials and be able to identify some of the major areas that provide these raw materials.</p> <p>b. Know the method used for the extraction of the materials used.</p>	<p>TAPES: V.T.R./V.C.R. if available.</p>
<p>2. Raw materials must be processed in order to provide materials of standard size and quality which can be used for manufacturing useful components or products.</p>	<p>2. Processing</p> <p>a. Refining/ converting</p>	<p>a. Know the method used to refine and convert the materials used.</p>	<p>BOOK: <u>General Metals</u></p>
<p>3. The procurement and processing of materials resources has various implications upon our society.</p>	<p>3. Societal implications</p> <p>a. Conservation</p> <p>b. Ecology</p>	<p>a. Have a basic understanding of the need for conservation.</p> <p>b. Know some of the effects upon the ecology and regulations governing rock hounds.</p>	<p>TAPES: V.T.R./V.C.R. if available.</p>
<p>4. Selection of the proper materials for the product and testing the materials are very important functions of industry.</p>	<p>4. Identification</p> <p>a. Properties</p> <p>b. Testing</p>	<p>a. Know the basic properties of the materials used in product development.</p> <p>b. Perform simple tests on the materials to determine comparative weight, strength, hardness, etc. (Follow proper safe procedures.)</p>	<p>BOOK: <u>General Shop</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>5. The successful completion of a product depends upon design and accurate layout and measurement.</p> <p>6. During the process of manufacturing products or components, materials have to be separated.</p>	<p>5. Product planning</p> <ul style="list-style-type: none"> <li>a. Design principles</li> <li>b. Measurement systems                             <ul style="list-style-type: none"> <li>- English</li> <li>- Metric</li> </ul> </li> <li>c. Layout and measurement</li> </ul> <p>6. Separation processes</p> <ul style="list-style-type: none"> <li>a. Chip removal</li> <li>b. Non-chip removal</li> <li>c. Chemical action</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Become familiar with the design principles and be able to interpret simple technical drawings.</li> <li>b. Use both systems of measurement in product development.</li> <li>c. Become familiar with and handle measurement and layout tools satisfactorily.</li> </ul> <ul style="list-style-type: none"> <li>a. Identify and use chip removal separation tools and equipment, following proper safe procedures.</li> <li>b. Identify and use non-chip removal separating tools and equipment, following proper safe procedures.</li> <li>c. Produce a product using separation by chemical action, following proper safe procedures.</li> </ul>	<p>BOOKS:</p> <p><u>Step-by-Step Jewelry</u> <u>Design in Metal</u></p> <p>BOOKS:</p> <p><u>General Metals</u> <u>Basic Crafts</u> <u>Art Metals</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>7. During the manufacturing of products or components, materials can be shaped with or without adding or removing materials.</p> <p>8. During the manufacturing of products or components, it may be necessary to change the properties of the material.</p>	<p>7. Forming processes</p> <ul style="list-style-type: none"> <li>a. Bending</li> <li>b. Embossing/ Moulding</li> <li>c. Casting</li> <li>d. Spinning</li> </ul> <p>8. Conditioning processes</p> <ul style="list-style-type: none"> <li>a. Heat</li> <li>b. Physical</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Bend the materials used, following proper safe procedures.</li> <li>b. Produce a product such as a copper tooling which uses embossing.</li> <li>c. Cast a product using a metal with a low melting point such as cerebond. (Optional)</li> <li>d. Produce a product by metal spinning, following proper safe procedures. (Optional)</li> <li>e. Identify and use as any other methods of forming as the teacher desires.</li> </ul> <ul style="list-style-type: none"> <li>a. Identify and use the heat treating processes necessary in product development, following proper safe procedures.</li> <li>b. Identify and use the physical conditioning processes necessary in product development, following proper safe procedures.</li> </ul>	<p>BOOKS:</p> <ul style="list-style-type: none"> <li><u>General Metals</u></li> <li><u>An Introduction to Creative Metalwork.</u></li> </ul> <p>BOOK:</p> <ul style="list-style-type: none"> <li><u>General Metals</u></li> </ul>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>9. Materials of similar or different properties and composition can be combined to produce useful, desirable and aesthetic products.</p> <p>10. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>9. Combining processes</p> <p>a. Adhesion</p> <p>b. Cohesion</p> <p>c. Coating</p> <p>d. Mechanical fasteners</p> <p>e. Mixing</p> <p>10. Occupational information</p> <p>a. High school programs</p> <p>b. Career opportunities</p>	<p>The student will:</p> <p>a. Have a basic understanding of the principles used in soldering, brazing and the use of epoxy cement and other adhesives.</p> <p>b. Identify and use welding or cohesive combining processes.</p> <p>c. Identify and use the coating processes available, following proper safe procedures.</p> <p>d. Identify and know when to use the fastening devices available.</p> <p>e. Identify and use the mixing processes available, following proper safe procedures.</p> <p>a. Know what high school programs are available in the relative career fields.</p> <p>b. Identify several occupations in the related career fields and become aware of the educational requirements.</p> <p>c. Visit open house at various high schools. (Optional)</p> <p>d. Go on field trips. (Optional)</p>	<p>BOOKS:</p> <p><u>General Metals</u></p> <p><u>Copper Enamelling</u></p> <p>PAMPHLETS:</p> <p>Check with Counseling and Guidance office.</p>





## Module Three

## LEATHER AND TEXTILES TECHNOLOGY

## Introduction

Because leather and textiles, both natural and synthetic, play a very important part in our daily living, the result is large industrial concerns. Through the application of the concepts to product fabrication, the student will become more aware of the leather and textile industries. Care should be taken to emphasize the industrial concepts of the area rather than the art/crafts approach.

## References

- Cherry, Raymond. General Leathercraft. McKnight and McKnight, 1955
- Di Valentin, Maria. Practical Encyclopedia of Frafts. New York: Sterling Publishing, 1972
- Groneman, Chris H. and John L. Feirer. General Shop. McGraw-Hill, 1969
- Lindbeck, John R. and others. Basic Crafts. Chas.A. Bennet, 1969
- Lux, Donald G. and Willis E. Ray. World of Manufacturing. McKnight and McKnight, 1971
- Proud, Nora. Introducing Textile Printing. New York: Watson-Guptill, 1968
- Zimmerman, Fred W. Leathercraft. Goodheart-Willcox, 1961
- Alberta Education. A.I.D. BOOKLETS. 1973\*
- Alberta Education. A.I.D. YEARBOOK. 1974\*

---

\*Available at the School Book Branch, Alberta Education

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. The development and effective utilization of a nation's resources is necessary for a productive society.</p>	<p>1. Sources a. Location</p>	<p>The student will: a. Know the raw materials for leather and textiles and identify several areas that are major locations of the raw material.</p>	<p>TAPES: V.T.R./V.C.R. if available.</p>
<p>2. Raw materials must be processed in order to provide standard size and quality material which can be used for manufacturing useful components or products.</p>	<p>2. Processing a. Refining/ Converting</p>	<p>a. Have a basic understanding of how hides are tanned to produce leather. b. Have a basic understanding of how textiles are produced.</p>	<p>BOOKS: <u>General Leathercraft</u> <u>The World of Manufacturing</u></p>
<p>3. The procurement and processing of material resources has various implications upon our society.</p>	<p>3. Societal implications a. Conservative b. Ecology</p>	<p>a. Have a basic understanding of the need for conservation of our natural resources. b. Know some of the effects upon the ecology.</p>	<p>TAPES: V.T.R./V.C.R. if available.</p>
<p>4. Selection of the proper material for the product and testing the material are very important functions of industry.</p>	<p>4. Identification a. Properties b. Testing</p>	<p>a. Know the basic properties of the materials used in product development. b. Perform simple tests on the materials used to determine strength, elasticity, resistance to stain, etc. (Follow proper safe procedures.)</p>	<p>BOOK: <u>Basic Crafts</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>5. The successful completion of a product depends upon design and accurate layout and measurement.</p>	<p>5. Product planning</p> <ul style="list-style-type: none"> <li>a. Design principles</li> <li>b. Measurement systems                             <ul style="list-style-type: none"> <li>- English</li> <li>- Metric</li> </ul> </li> <li>c. Layout and measurement tools</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Become familiar with design principles and be able to interpret simple technical drawings.</li> <li>b. Use both systems of measurement in product development.</li> <li>c. Become familiar with and handle measurement and layout tools satisfactorily.</li> </ul>	<p>BOOK: <u>General Leathercraft</u></p>
<p>6. During the process of manufacturing products or components, materials have to be separated.</p>	<p>6. Separation processes</p> <ul style="list-style-type: none"> <li>a. Non-chip removal</li> </ul>	<ul style="list-style-type: none"> <li>a. Know that the most common method of separating leather and textiles is by using the non-chip removal process of shearing.</li> <li>b. Identify and use the separating tools available, following proper safe procedures.</li> </ul>	<p>BOOK: <u>General Shop</u></p>
<p>7. During the manufacturing of products or components, materials can be shaped without adding or removing material.</p>	<p>7. Forming processes</p> <ul style="list-style-type: none"> <li>a. Carving/Stamping</li> <li>b. Embossing</li> <li>c. Moulding</li> </ul>	<ul style="list-style-type: none"> <li>a. Surface decorate a leather product by carving and/or stamping.</li> <li>b. Emboss a product following proper safe procedures.</li> <li>c. Produce a product where the material is stretch moulded over a die.</li> </ul>	<p>BOOK: <u>General Leathercraft</u></p>

Generalizations	Concept Subconcepts	Learning Task	Resources
<p>8. During the manufacturing of products or components, it may be necessary to change the properties of the material.</p>	<p>8. Conditioning processes</p> <ul style="list-style-type: none"> <li>a. Moisture</li> <li>b. Slashing</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Know and use the proper safe procedures for conditioning materials with moisture.</li> <li>b. Know that during slashing, yarn is treated with a hot solution of starch, wax, oil and water to strengthen it.</li> <li>c. Starch some textile and see the effects. (Optional)</li> </ul>	<p>BOOK:</p> <p><u>World of Manufacturing.</u></p>
<p>9. Materials of similar or different properties and composition can be combined to produce useful, durable and aesthetic products.</p>	<p>9. Combining processes</p> <ul style="list-style-type: none"> <li>a. Adhesion</li> <li>b. Coating</li> <li>c. Mechanical fasteners</li> <li>d. Weaving</li> </ul>	<ul style="list-style-type: none"> <li>a. Identify and use the proper adhesive for the type of materials to be bonded together.</li> <li>b. Identify and use the coating procedures available, following proper safe procedures.</li> <li>c. Identify and use the proper mechanical fasteners available.</li> <li>d. Know and use several weaving processes, following proper safe procedures. (Optional)</li> </ul>	<p>BOOKS:</p> <p><u>General Leathercraft</u></p> <p><u>General Shop</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>10. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>10. Occupational information</p> <ul style="list-style-type: none"> <li>a. High school programs.</li> <li>b. Career opportunities</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Know what high school programs are available in the related career fields.</li> <li>b. Identify several occupations in the related career fields and become aware of the educational requirements.</li> <li>c. Visit open house at various high schools.(Optional)</li> <li>d. Go on field trips. (Optional)</li> </ul>	<p>PAMPHLETS: Check with Counseling and Guidance offices.</p>



Module Four

METALS TECHNOLOGY

Introduction

Metal Technology plays an important role in our productive society. The metals area will provide the student with an understanding and appreciation of the use of metal in product development. The processes demonstrate the common aspects of the other material areas, while the same processes illustrates the different applications.

References

- Almeida, Oscar. Metalworking. New York: Drake Publishers, 1972
- Feirer, John L. General Metals. McGraw-Hill, 1967
- Glazener, Everett R. Basic Metal Working Technology. Austin, Texas: Steck-Vaughin, 1970
- Groneman, Chris H. and John L. Feirer. General Industrial Education. McGraw-Hill, 1974
- Lindbeck, John R. and Irvin T. Lathrop. General Industry. Chas. A. Bennet, 1969
- Lux, Donald G. and Willis E. Ray. World of Manufacturing. McKnight and McKnight, 1971
- Pringle, Laurence. Recycling Resources. New York: MacMillan, 1970
- Walansky, William D. and others. Industrial Arts. Toronto: McGraw-Hill (Canada), 1968
- Alberta Education. A.I.D. BOOKLETS. 1973\*
- Alberta Education. A.I.D. YEARBOOK. 1974\*

---

\*Available at the School Book Branch, Alberta Education

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. The development and effective utilization of a nation's resources is necessary for a productive society.</p>	<p>1. Sources</p> <ul style="list-style-type: none"> <li>a. Location</li> <li>b. Extraction</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Know the main raw materials and be able to identify the major areas that provide these raw materials.</li> <li>b. Know that the main raw materials are extracted by surface or underground mining.</li> </ul>	<p>TAPES: V.T.R./V.C.R. if available.</p>
<p>2. Raw materials must be processed in order to provide material of standard size and quality which can be used for manufacturing useful components or products.</p>	<p>2. Processing</p> <ul style="list-style-type: none"> <li>a. Refining/ converting</li> <li>b. Alloying</li> </ul>	<ul style="list-style-type: none"> <li>a. Identify the main processes used in the production of iron.</li> <li>b. Have a basic understanding of alloying and know several reasons why alloys are made.</li> </ul>	<p>BOOK: <u>General Metals</u></p>
<p>3. The procurement and processing of material resources has various implications upon our society.</p>	<p>3. Societal implications</p> <ul style="list-style-type: none"> <li>a. Conservation</li> <li>b. Ecology</li> </ul>	<ul style="list-style-type: none"> <li>a. Have a basic understanding of the need for conservation and recycling.</li> <li>b. Know some of the effects upon the ecology.</li> </ul>	<p>BOOK: <u>World of Manufacturing</u></p>
<p>4. Selection of the proper materials for the product and testing the materials are very important functions of industry.</p>	<p>4. Identification</p> <ul style="list-style-type: none"> <li>a. Properties</li> <li>b. Testing</li> </ul>	<ul style="list-style-type: none"> <li>a. Know the basic properties of the metals used in products developed.</li> <li>b. Perform simple tests on the metals used to determine carbon content, hardness, easiness</li> </ul>	<p>BOOK: <u>General Shop</u></p>



Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>5. The successful completion of a product depends upon design and accurate layout and measurement.</p> <p>6. During the process of manufacturing products or components, materials have to be separated.</p>	<p>5. Product planning</p> <ol style="list-style-type: none"> <li>a. Design principles</li> <li>b. Measurement systems               <ul style="list-style-type: none"> <li>- English</li> <li>- Metric</li> </ul> </li> <li>c. Layout and measurement tools</li> </ol> <p>6. Separation processes</p> <ol style="list-style-type: none"> <li>a. Chip removal</li> <li>b. Non-chip removal</li> <li>c. Others               <ul style="list-style-type: none"> <li>- heat</li> <li>- chemical</li> <li>- electrical</li> </ul> </li> </ol>	<p>The student will:</p> <p>to work, etc. (Follow proper safe procedures.)</p> <ol style="list-style-type: none"> <li>a. Become familiar with the design principles and be able to interpret simple technical drawings.</li> <li>b. Use both systems of measurement in product development.</li> <li>c. Become familiar with and handle measurement and layout tools satisfactorily.</li> <li>a. Comparative test of the operation of hand and machine chip removal separation tools in terms of speed, effort and safety.</li> <li>b. Know the basic principles used in non-chip removal and identify the tools and equipment used.</li> <li>c. Have a basic understanding of separation by the use of heat, chemical and electrical action.</li> <li>d. Identify and use the separating tools and equipment available following proper safe procedures.</li> </ol>	<p>BOOK:</p> <p><u>General Metals</u></p> <p>BOOK:</p> <p><u>General Shop</u></p> <p>BOOKS:</p> <p><u>General Industry</u></p> <p><u>World of Manu - facturing</u></p> <p><u>General Metals</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>7. During the manufacturing of products or components, materials can be shaped without adding or removing material.</p>	<p>7. Forming processes                      a. Bending                      b. Forging                      c. Casting/                      Moulding</p>	<p>The student will:</p> <p>a. Bend hot and/or cold metal, following proper safe procedures.</p> <p>b. Identify and use the forging process in product development, following proper safe procedures.</p> <p>c. Identify and use the casting processes available, following proper safe procedures. (Optional)</p>	<p>BOOKS:  <u>General Industry</u>  <u>World of Manufacturing</u></p>
<p>8. During the manufacturing of products or components, it may be necessary to change the properties of the materials</p>	<p>8. Conditioning processes                      a. Heat                      b. Physical</p>	<p>a. Identify and use the heat treating processes necessary in product development, following proper safe procedures.</p> <p>b. Know that metals can be conditioned by physical means.</p>	<p>BOOK:  <u>General Metals</u></p>
<p>9. Materials of similar or different properties and composition can be combined to produce useful, durable and aesthetic products.</p>	<p>9. Combining processes                      a. Adhesion                      b. Cohesion</p>	<p>a. Have a basic understanding of the principles used in soldering, brazing and the use of epoxy cement and other adhesives.</p> <p>b. Identify and use welding as a cohesive combining process and explain the safe operation of the welder.</p>	<p>BOOK:  <u>General Industry</u>  <u>World of Manufacturing</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>10. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>c. Coating</p> <p>d. Mechanical fasteners</p> <p>10. Occupational information</p> <p>a. High school programs</p> <p>b. Career opportunities</p>	<p>The student will:</p> <p>c. Know that coating protects the material and improves the appearance of the product.</p> <p>d. Identify and know when to use the fastening devices available.</p> <p>e. Use the combining processes available, following proper safe procedures.</p> <p>a. Have an understanding of the high school programs available in the related career fields.</p> <p>b. Identify several occupations in the related career fields and become aware of the educational requirements.</p> <p>c. Visit open house at various high schools. (Optional)</p> <p>d. Go on field trips. (Optional)</p>	<p>FILMSTRIP: Fastening Devices TK 2161 (Audio Visual Services Branch, Alberta Education)</p> <p>PAMPHLETS: Check with Counselling and Guidance Offices</p>



## Module Five

### PLASTICS TECHNOLOGY

#### Introduction

Plastics is rapidly becoming an important material in industry today. It is currently replacing several wood and metal products used in the home. The plastics module is designed to introduce the student to the various types of plastics and the processes used to improve the usefulness of the material. Through careful selection of products produced in the laboratories, the student will be exposed to as many of the tools and machines as possible in order that they may experience the industrial processes first hand.

#### References

- Cherry, Raymond. General Plastics Projects and Procedures. McKnight and McKnight, 1967
- Cope, Dwight. Cope's Plastic Book. Goodheart-Willcox, 1960
- Lindbeck, John R. and others. Basic Crafts. Chas. A. Bennett, 1969
- Lux, Donald G. and Willis E. Ray. World of Manufacturing. McKnight and McKnight, 1971
- Swanson, Robert S. Plastics Technology. McKnight and McKnight, 1965
- Pringle, Laurence. Recycling Resources. New York: MacMillan, 1974
- Alberta Education. A.I.D. BOOKLETS. 1973\*
- Alberta Education. A.I.D. YEARBOOK. 1974\*

---

\*Available at the School Book Branch, Alberta Education

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. The development and effective utilization of a nation's resources necessary for a productive society.</p> <p>2. Raw materials must be processed in order to provide material of standard size and quality which can be used for manufacturing useful components or products.</p> <p>3. The procurement and processing of material resources has various implications upon our society.</p> <p>4. Selection of the proper materials for the product and testing of materials is an important function of manufacturing.</p>	<p>1. Sources</p> <p>a. Location</p> <p>b. Extraction</p> <p>2. Processing</p> <p>a. Refining</p> <p>b. Synthetics</p> <p>3. Societal implications</p> <p>a. Conservation</p> <p>b. Ecology</p> <p>4. Identification</p> <p>a. Properties</p> <p>b. Testing</p>	<p>The student will:</p> <p>a. Know the raw materials for plastics and be able to locate on a map of Canada some of the major locations of the raw material.</p> <p>b. Understand that natural gas is extracted by drilling.</p> <p>a. Know the basic principles in the production of plastic.</p> <p>b. Know that plastic is a man made product.</p> <p>a. Have a basic understanding of the need for conservation.</p> <p>b. Have a basic understanding of the effects of plastic materials on ecology.</p> <p>a. Refer to a list of general properties of the various plastics.</p> <p>b. Perform several simple comparative tests to determine strength, elasticity, solubility, etc. (Follow proper safe procedures.)</p>	<p>BOOK: <u>Plastics Technology</u></p> <p>FILM: <u>Kingdom of Plastics</u> (General Electric)</p> <p>FILM: <u>Prospects for Plastics</u> (Shell Oil)</p> <p>TAPES: <u>V.T.R./V.C.R.</u> if available.</p> <p>BOOK: <u>Recycling Resources</u></p> <p>BOOK: <u>Plastics Technology</u></p> <p>PAMPHLET: "Properties of Plastics" (C.I.L.)</p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>5. The successful completion of a product depends upon design and accurate layout and measurement.</p> <p>6. During the process of manufacturing products or components, materials have to be separated.</p>	<p>5. Product planning</p> <ul style="list-style-type: none"> <li>a. Design principles</li> <li>b. Measurement systems                             <ul style="list-style-type: none"> <li>- English</li> <li>- Metric</li> </ul> </li> </ul> <p>6. Separation processes</p> <ul style="list-style-type: none"> <li>a. Chip removal</li> <li>b. Non-chip removal</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Become familiar with the design principles and be able to interpret simple technical drawings.</li> <li>b. Use both systems of measurement in product development.</li> <li>c. Become familiar with and use measurement and layout tools satisfactorily.</li> </ul> <ul style="list-style-type: none"> <li>a. Identify and use the chip removal separating tools and equipment available, following proper safe procedures.</li> <li>b. Identify and use the non-chip removal separating tools available, following proper safe procedures.</li> <li>c. Classify the separating tools and equipment used according to the process as of:                             <ul style="list-style-type: none"> <li>sawing</li> <li>drilling</li> <li>- turning</li> <li>- milling</li> <li>- abrading</li> <li>- shearing</li> </ul> </li> <li>d. Know that the cutting edge of separating tools must be harder than the material being separated.</li> </ul>	<p>BOOK: <u>General Plastics</u></p> <p>BOOKS: <u>General Industry</u> <u>World of Manufacturing</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>7. During the manufacturing of products or components, materials can be shaped without adding or removing any material.</p>	<p>7. Forming processes</p> <ol style="list-style-type: none"> <li>Bending</li> <li>Vacuum/blow forming</li> <li>Casting/Moulding</li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>Know and use proper safe procedures for bending thermofforming plastics.</li> <li>Know the principles of vacuum and blow forming.</li> <li>Identify the various casting and/or moulding procedures in the plastics area and list several products that can be made with each procedure.</li> <li>Use the forming tools and equipment available, following proper safe procedures.</li> </ol>	<p>FILM: <u>Forming Plastic Sheet Materials</u> (Robert Morse Corporation)</p> <p>BOOKS: <u>General Industry World of Manufacturing</u></p>
<p>8. During the manufacturing of products or components, it may be necessary to change the properties of the material.</p>	<p>8. Conditioning processes</p> <ol style="list-style-type: none"> <li>Heat</li> </ol>	<ol style="list-style-type: none"> <li>Know the proper heat requirements for conditioning various plastics.</li> <li>Know the effect of heat on thermoset and thermofform plastics.</li> </ol>	<p>BOOK: <u>General Plastics</u></p>
<p>9. Materials of similar or different properties and composition can be combined to produce useful, durable and aesthetic products.</p>	<p>9. Combining processes</p> <ol style="list-style-type: none"> <li>Adhesion</li> <li>Mechanical fastening</li> </ol>	<ol style="list-style-type: none"> <li>Identify and use the proper adhesive for the type of materials to be bonded together.</li> <li>Identify and use the mechanical fastening devices available.</li> </ol>	<p>BOOKS: <u>General Industry World of Manufacturing</u> <u>General Plastics</u></p>



Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>10. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>c. Cohesion</p> <p>d. Coating</p> <p>e. Mixing</p> <p>10. Occupational information</p> <p>a. High school programs</p> <p>b. Career opportunities.</p>	<p>The student will:</p> <p>c. Identify and use the proper cohesive bonding solvents and equipment available, following proper safety procedures.</p> <p>d. Use the coating procedures available in the area, following proper safe procedures.</p> <p>e. Identify materials mixed and the safe procedures used.</p> <p>f. Have a basic understanding of the combining processes as to when and why they are used.</p> <p>a. Have an understanding of the high school programs available in the related career fields.</p> <p>b. Identify several occupations in the related career fields and become aware of the educational requirements.</p> <p>c. Visit open house at various high schools. (Optional)</p> <p>d. Go on field trips. (Optional)</p>	<p>PAMPHLETS: Check with Counseling and Guidance Office.</p>



## Module Six

### WOODS TECHNOLOGY

#### Introduction

Wood is probably one of the most common and important materials used in industry. This module will provide the opportunity for the student to become in contact with common woods and wood products and tools and equipment involved in processes used by industry. Through the fabrication of products the students should gain a better understanding of the industrial world of today.

#### References

- Groneman, Chris H. General Woodworking. McGraw-Hill, 1964
- Groneman, Chris H. and John L. Feirer. General Industrial Education. McGraw-Hill, 1974
- Groneman, Chris H. and John L. Feirer. General Shop. McGraw-Hill, 1969
- Groneman, Chris H. and Everett R. Glazener. Technical Woodworking. McGraw-Hill, 1966
- Lindbeck, John R. and Irvin T. Lathrop. General Industry. Chas A. Bennett, 1969
- Lux, Donald G. and Willis E. Ray. World of Manufacturing. McKnight and McKnight, 1971
- Pringle, Laurence. Recycling Resources. New York: MacMillan, 1974
- Wolansky, William D. and others. Industrial Arts. Toronto: McGraw-Hill (Canada), 1968
- Alberta Education. A.I.D. BOOKLETS. 1973\*
- Alberta Education. A.I.D. YEARBOOK. 1974\*

---

\*Available at the School Book Branch, Alberta Education

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. The development and effective utilization of a nation's resources is necessary for a productive society.</p> <p>2. Raw materials must be processed in order to provide materials of standard size and quality which can be used for manufacturing useful components or products.</p> <p>3. The procurement and processing of material resources has various implications upon our society.</p> <p>4. Selection of the proper material for the product and testing the material are very important functions of industry.</p>	<p>1. Sources</p> <p>a. Location</p> <p>b. Logging</p> <p>2. Processing</p> <p>a. Lumber</p> <p>b. Plywood</p> <p>c. Pulp and paper</p> <p>3. Societal implications</p> <p>a. Conservation</p> <p>b. Ecology</p> <p>4. Identification</p> <p>a. Classification</p> <p>b. Properties</p>	<p>The student will:</p> <p>a. Identify the provinces that are major producers of the raw material.</p> <p>b. Have a basic understanding of logging procedures.</p> <p>a. Know the basic processes of producing lumber and the basic dimensional sizes of lumber.</p> <p>b. Have a basic understanding of how plywood is produced.</p> <p>c. Know that the pulp and paper industry plays a large part in the Canadian economy.</p> <p>a. Have a basic understanding of the need for conservation and reforestation.</p> <p>b. Know some of the effects upon the ecology.</p> <p>a. Know that woods are classified as softwoods and hardwoods.</p> <p>b. Know the basic properties of the woods used in their products.</p>	<p>BOOKS:</p> <p><u>Woodworking Technology</u></p> <p><u>Technical Woodworking</u></p> <p>FILM on logging and/or lumbering.</p> <p>BOOK:</p> <p><u>Technical Woodworking</u></p> <p>BOOKS:</p> <p><u>World of Manufacturing</u></p> <p><u>Recycling Resources</u></p> <p>BOOKS:</p> <p><u>General Woodworking</u></p> <p><u>Technical Woodworking</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>5. The successful completion of a product depends upon design and accurate layout and measurement.</p> <p>6. During the process of manufacturing products or components, materials have to be separated.</p>	<p>c. Testing</p> <p>5. Product planning</p> <p>a. Design principles</p> <p>b. Measurement systems</p> <p>- English</p> <p>- Metric</p> <p>c. Layout and measurement tools</p> <p>6. Separation processes</p> <p>a. Chip removal</p> <p>b. Non-chip removal</p>	<p>The student will:</p> <p>c. Perform simple tests on the woods used to determine hardness, easiness to work, etc. (Follow proper safe procedures.)</p> <p>a. Become familiar with the design principles and be able to interpret simple technical drawings.</p> <p>b. Use both systems of measurement in product development.</p> <p>c. Become familiar with and handle measurement and layout tools satisfactorily.</p> <p>a. Know that the basic principle used in separation by chip removal is the wedge.</p> <p>b. Know the basic principle used in non-chip removal and identify the tools and equipment used.</p> <p>c. Know the effect of several basic principles such as speed, effort, sharpness, etc., as related to separating materials.</p> <p>d. Identify and use the separating tools and equipment available, following proper safe procedures</p>	<p>BOOKS:</p> <p><u>General Testing</u></p> <p><u>General Wood-working</u></p> <p>BOOKS:</p> <p><u>General Industry</u></p> <p><u>World of Manufacturing</u></p> <p>WALL CHARTS AND DIAGRAMS</p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>7. During the manufacturing of products or components, materials can be shaped without adding or removing materials.</p>	<p>7. Forming processes</p> <ul style="list-style-type: none"> <li>a. Bending</li> <li>b. Casting/ Moulding</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Know the basic procedure for bending wood and complete a laminated wood product.</li> <li>b. Know that wood can be cast or moulded only after it is ground up and mixed with other materials as in the extrusion moulding of particle board.</li> </ul>	<p>BOOKS: <u>General Industry</u> <u>World of Manufacturing</u></p> <p>BOOK: <u>Technical Woodworking</u></p>
<p>8. During the manufacturing of products or components, it may be necessary to change the properties of the material.</p>	<p>8. Conditioning processes</p> <ul style="list-style-type: none"> <li>a. Moisture</li> </ul>	<ul style="list-style-type: none"> <li>a. Identify and use the moisture conditioning processes available, following proper safe procedures.</li> </ul>	<p>BOOK: <u>General Industry</u></p>
<p>9. Materials of similar or different properties and composition can be combined to produce useful, durable and aesthetic products.</p>	<p>9. Combining processes</p> <ul style="list-style-type: none"> <li>a. Adhesion</li> <li>b. Coating</li> <li>c. Mechanical fasteners</li> </ul>	<ul style="list-style-type: none"> <li>a. Identify and use the proper adhesive for the type of material to be bonded together.</li> <li>b. Use the coating processes available, following proper safe procedures.</li> <li>c. Identify and use the proper mechanical fastening devices available.</li> <li>d. Have a basic understanding of the combining processes as to when and why they are used.</li> </ul>	<p>BOOK: <u>General Woodworking</u></p> <p>WALL CHARTS AND DIAGRAMS</p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>10. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>10. Occupational information</p> <ol style="list-style-type: none"> <li>a. High school programs</li> <li>b. Career opportunities</li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Have an understanding of the high school programs available in the related career fields.</li> <li>b. Identify several occupations in the related career fields and become aware of the educational requirements.</li> <li>c. Visit open house at various high schools.(Optional).</li> <li>d. Go on field trips. (Optional)</li> </ol>	<p>PAMPHLETS: Check with Counselling and Guidance Office.</p>





## VISUAL COMMUNICATIONS TECHNOLOGY

### Introduction

Visual Communication is defined as imparting knowledge by sight. Therefore, the entire field of graphics is included under the heading of visual communications.

For thousands of years man has been preserving his thoughts in pictures and words, but today newspapers, magazines and books provide this kind of communication. Since printing and publishing materials is a leading industry in Canada, the importance of graphics today cannot be overemphasized. Whatever segment of our society we examine - the planning of our homes, the automation and computerization of our industries, the achievements in communications ranging from the local newspaper to the communication satellite, the beckoning of whatever deeper knowledge may lead outside the circumference of our own planet as we venture out into space - all require some form of graphics in their production.

### Specific Objectives

1. To develop in the student an appreciation of the importance of graphics in all aspects of a productive society.
2. To develop an appreciation for the many applications of lightsensitive materials in a productive society.
3. To impress upon the student, through practical experiences, the importance of technical design and illustration in a complex technological society.
4. To develop a basic understanding of the basic processes and their interdependence in the various areas of graphics.
5. To develop positive attitudes toward safety and the dignity of work.
6. To assist the student to explore the graphics area and identify interests or abilities in the related career fields.

### Suggested Approaches

The object of the Visual Communications Technology modules is to provide an opportunity for the student to obtain a small view of the graphics industry. The Graphics module consists of seven (7) topics while the Photography/Drafting module consists of six (6) topics. To provide some flexibility an exchange of topics between the two modules is allowed. A core of three (3) topics are to be taught for 15 hours as basic to a module. Then additional topics taught for five (5) hours each may be added to make the module a total of 25 hours in length. The additional topics may be selected from either the Graphics or Photography/Drafting modules.

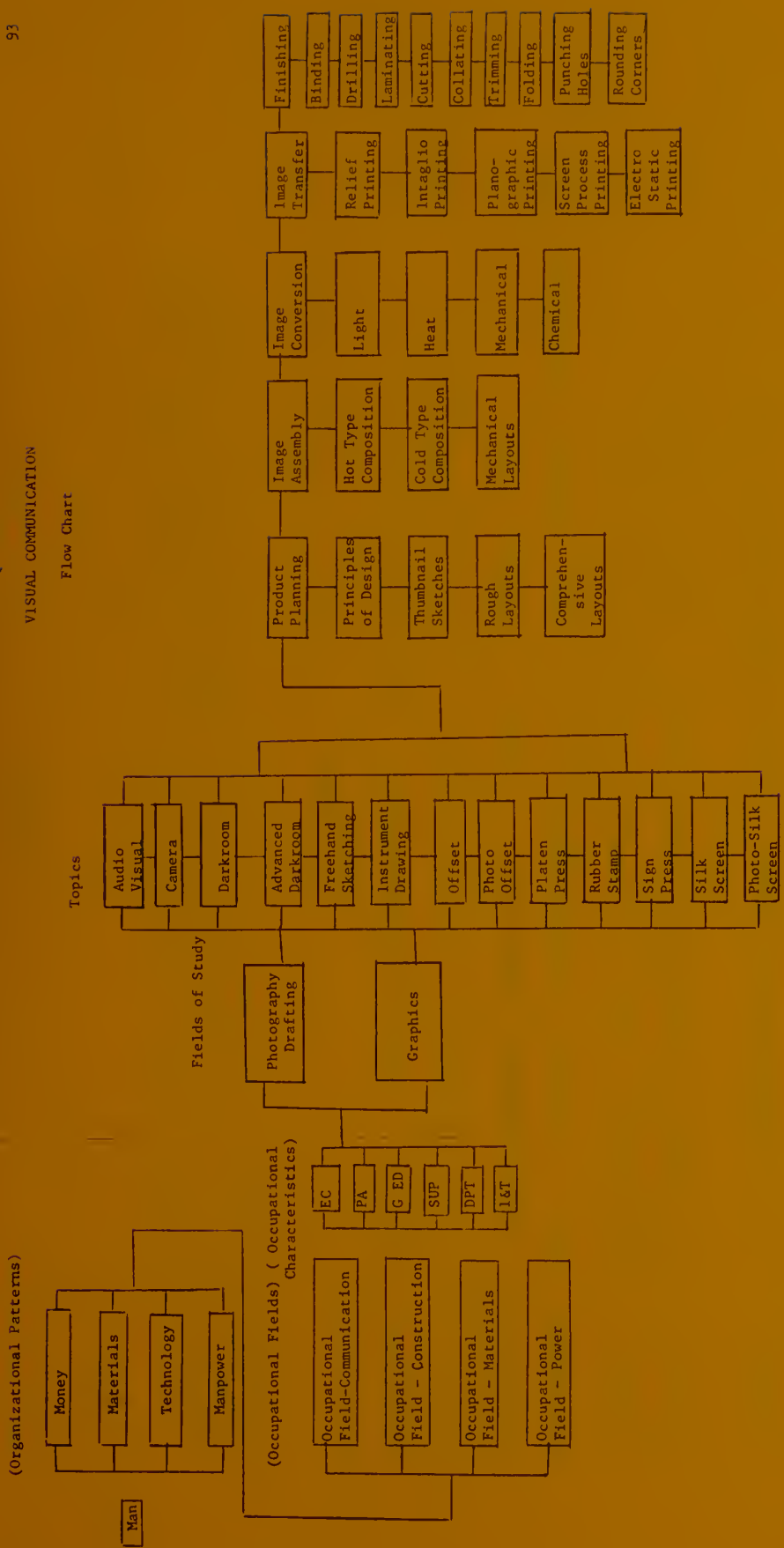
The product both teacher and/or student designed is an excellent vehicle for motivating students to learn and interpret the processes in a meaningful way. The topics in the Visual Communication Technology modules are designed for as much "hands-on" activity as time will permit. It should also be understood that when necessary, demonstration-type lectures and learning packages can supply the theory required for a total understanding of the processes.

### Safety

Whenever students are involved in "hands-on" activity, safety instruction is of utmost importance. Safe practices should be followed at all times. The machines should be properly guarded and the students should be properly dressed.

VISUAL COMMUNICATION

Flow Chart





## Module One

### GRAPHICS

#### Introduction

The Graphics module is related primarily to the printing industry. Since the printing industry is a very large industry in terms of economics and the impact it has on people, a basic understanding of this industry should lead the students to a better understanding of the world they live in.

#### References

- Brockhuzen, Richard J. Graphic Communications. McKnight and McKnight, 1973
- Carlsen, Darvey E. Graphic Arts. Peoria, Illinois: Chas. A. Bennett, 1965
- Cogli, John E. Photo-Offset Fundamentals. McKnight and McKnight, 1957
- Eisenbery, James and Francis J. Kafka. Silk Screen Printing. McKnight and McKnight, 1957
- Kagy, F. D. Graphic Arts. Home Wood, Illinois: Goodheart-Willcox, 1965
- Polk, R. W. The Practice of Printing. Revised Edition. Peoria, Illinois: Chas A. Bennett, Inc.
- Spellmen, J. A. Printing Works Like This. London: Phoenix House, 1964
- Alberta Education. A.I.D. BOOKLETS. 1973\*
- Alberta Education. A.I.D. YEARBOOK. 1974\*

---

\*Available at the School Book Branch, Alberta Education

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Initial designing and planning of the message to be printed predetermines the appearance of the completed product.</p> <p>2. The message to be printed must be assembled to represent the appearance of the completed product.</p> <p>3. The prepared image on a special image carrier or plate can be transferred onto paper using the offset lithography principle to produce identical multiple copies.</p> <p>4. The printed copies can undergo various processes in order to make the product more attractive or useful.</p> <p>5. A productive society must prepare its youth to make realistic vocational changes</p>	<p>1. Product planning</p> <p>a. Principles of design</p> <p>2. Image assembly</p> <p>a. Hot and/or cold type composition</p> <p>3. Image transfer</p> <p>a. Offset lithography</p> <p>4. Finishing processes</p> <p>5. Occupational information</p>	<p>The student will:</p> <p>a. Identify the basic principles of design and produce simple thumbnail sketches, rough and comprehensive layouts.</p> <p>a. Prepare a direct image master using composition materials and equipment available.</p> <p>a. Know the principle of offset lithography.</p> <p>b. Prepare and operate the offset press in a safe manner.</p> <p>c. Clean the offset press.</p> <p>a. Finish their product using available finishing processes such as cutting, trimming, binding, punching holes, folding, etc. (Follow proper safe procedures.)</p> <p>a. Become aware of high school programs and career opportunities available in the related career fields.</p>	<p>BOOK: <u>Graphic Communications</u></p> <p>BOOK: <u>Photo-Offset</u></p> <p>MANUALS: Check with the manufacturer's operating manuals.</p> <p>PAMPHLETS: Check with the Counselling and Guidance Office.</p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<ol style="list-style-type: none"> <li>Initial designing and planning of the message to be printed predetermines the appearance of the completed product.</li> <li>The message to be printed must be assembled to represent the appearance of the completed product.</li> <li>The assembled image on the paste-up must be converted onto the proper image carrier or plate.</li> <li>The prepared image on an offset plate can be transferred onto paper by the offset process.</li> <li>The printed copies can undergo various processes in order to make the product more attractive or useful.</li> <li>A productive society must prepare its youth to make realistic vocational choices.</li> </ol>	<ol style="list-style-type: none"> <li>Product planning               <ol style="list-style-type: none"> <li>Principles of design</li> </ol> </li> <li>Image assembly               <ol style="list-style-type: none"> <li>Hot and/or cold type composition</li> </ol> </li> <li>Image conversion               <ol style="list-style-type: none"> <li>Photographic and/or electrostatic</li> </ol> </li> <li>Image transfer               <ol style="list-style-type: none"> <li>Offset lithography</li> </ol> </li> <li>Finishing processes</li> <li>Occupational information</li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>Use the basic principles of design to produce the thumbnail sketches and layout for your assignment or product.</li> <li>Prepare a mechanical layout or paste-up, using composition materials and equipment available.</li> <li>Use the equipment available to convert the image on the paste-up onto an offset plate.</li> <li>Prepare and operate the offset press in a safe manner.</li> <li>Clean the offset press.</li> <li>Finish products, using available finishing processes, cutting, trimming, binding, punching holes, folding, etc. (Follow proper safe procedures.)</li> <li>Become aware of high school programs and career opportunities available in the related career fields.</li> </ol>	<p>BOOK: <u>Graphic Communications</u></p> <p>BOOK: <u>Photo-Offset</u></p> <p>BOOK: <u>Graphic Communications</u></p> <p>MANUALS: Check with the manufacturer's operation manuals.</p> <p>BOOK: <u>Graphic Communications</u></p> <p>PAMPHLETS: Check with the Counselling and Guidance Office.</p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Initial designing and planning of the message to be printed predetermines the appearance of the completed product.</p> <p>2. The message to be printed must be assembled to represent the appearance of the completed product.</p> <p>3. Image conversion is not required because the sign press uses reverse type. The image is transferred using the relief method of printing.</p> <p>4. The printed copies can undergo various processes in order to make the product more useful.</p> <p>5. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>1. Product planning</p> <p>a. Principles design</p> <p>2. Image assembly</p> <p>a. Hot type composition</p> <p>3. Image transfer</p> <p>a. Relief printing</p> <p>4. Finishing processes</p> <p>5. Occupational information</p>	<p>The student will:</p> <p>a. Know that the principles of unity are very important and produce, simple thumbnail sketches rough and comprehensive layouts.</p> <p>a. Set and lock the type characters, using proper safe procedures.</p> <p>a. Know the principles of relief printing.</p> <p>b. Prepare and operate the platen press in a safe manner and evaluate the quality of the transferred image.</p> <p>c. Clean the platen press and type, using proper solvents.</p> <p>a. Finish products, using available finishing processes such as cutting, trimming, punching holes, rounding corners etc. (Follow proper safe procedures.</p> <p>a. Become aware of high school programs and career opportunities available in the related career fields.</p>	<p>BOOK: <u>Graphic Communication</u></p> <p>BOOK: <u>Graphic Arts</u></p> <p>BOOKS: <u>Graphic Communications</u> <u>Graphic Arts</u></p> <p>BOOK: <u>Graphic Communications</u></p> <p>PAMPHLETS: Check with the Counselling and Guidance Office.</p>



Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<ol style="list-style-type: none"> <li>1. Initial designing and planning of the message to be printed predetermines the appearance of the completed product.</li> <li>2. The message to be printed must be assembled to represent the appearance of the completed product.</li> <li>3. The assembled image in the chase must be converted onto the proper image carrier.</li> <li>4. The prepared image is transferred, using the relief method of printing.</li> <li>5. The final product can undergo various processes in order to make the product more attractive.</li> <li>6. A productive society must prepare its youth to make realistic vocational choices.</li> </ol>	<ol style="list-style-type: none"> <li>1. Product planning               <ol style="list-style-type: none"> <li>a. Principles of design</li> </ol> </li> <li>2. Image assembly               <ol style="list-style-type: none"> <li>a. Hot type composition</li> </ol> </li> <li>3. Image conversion</li> <li>4. Image transfer               <ol style="list-style-type: none"> <li>a. Relief printing</li> </ol> </li> <li>5. Finishing processes</li> <li>6. Occupational information</li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Know that the principles of unity are very important and produce simple thumbnail sketches, rough and comprehensive layouts.</li> <li>a. Set and lock-up the type characters, using proper safe procedures.</li> <li>a. Produce an image carrier by application of proper heat and pressure to convert the plastic matrix and vulcanizing rubber.</li> <li>a. Know the principles of relief printing, transfer the image and evaluate the quality.</li> <li>a. Complete the product by using finishing processes such as trimming, sanding, painting, etc. (Follow proper safe procedures.)</li> <li>a. Become aware of high school programs and career opportunities available in the related career fields.</li> </ol>	<p>BOOK: <u>Graphic Communications</u></p> <p>BOOK: <u>Graphic Arts</u></p> <p>BOOK: <u>Graphic Arts</u></p> <p>BOOK: <u>Graphic Communications</u></p> <p>BOOK: <u>Graphic Communications</u></p> <p>PAMPHLETS: Check with the Counselling and Guidance Office.</p>

## TOPIC: SIGN PRESS

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Initial designing and planning of the message to be printed predetermines the appearance of the completed product.</p>	<p>1. Product planning</p> <p>a. Principles of design</p>	<p>The student will:</p> <p>a. Know that the principles of unity are very important and produce simple thumbnail sketches, rough and comprehensive layouts.</p>	<p>BOOK: <u>Graphic Communications</u></p>
<p>2. The message to be printed must be assembled to represent the appearance of the completed product.</p>	<p>2. Image assembly</p> <p>a. Hot and cold type composition</p>	<p>a. Set and lock the type characters, using proper safe procedures.</p>	<p>OPERATOR'S MANUALS</p>
<p>3. Image conversion is not required because the sign press uses reverse type. The image is transferred using the relief method of printing.</p>	<p>3. Image transfer</p> <p>a. Relief printing</p>	<p>a. Know the principles of relief printing.</p> <p>b. Prepare and operate the sign press in a safe manner and evaluate the quality of the transferred image.</p>	<p>BOOK: <u>Graphic Communications OPERATOR'S MANUALS</u></p>
<p>4. The printed copies can undergo various processes in order to make the product more useful.</p>	<p>4. Finishing processes</p>	<p>c. Clean the sign press, type and equipment using proper solvent</p> <p>a. Finish the products, using available finishing processes such as cutting, trimming, punching holes, rounding corners, etc. (Follow proper safe procedures.)</p>	<p>BOOK: <u>Graphic Communications</u></p>
<p>5. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>5. Occupational information</p>	<p>a. Become aware of high school programs and career opportunities available in the related career fields.</p>	<p>PAMPHLETS: Check with the Counselling and Guidance Office.</p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<ol style="list-style-type: none"> <li>1. The design of a product is an important step in arriving at a suitable product.</li> <li>2. The message to be printed must be assembled.</li> <li>3. The conversion process requires the preparation of a stencil to suit the method used.</li> <li>4. The image can be transferred onto fabric or paper using the screen printing process.</li> <li>5. The printed copies can undergo various processes in order to make the product more attractive.</li> <li>6. A productive society must prepare its youth to make realistic vocational choices.</li> </ol>	<ol style="list-style-type: none"> <li>1. Product planning                             <ol style="list-style-type: none"> <li>a. Principles of design</li> </ol> </li> <li>2. Image assembly                             <ol style="list-style-type: none"> <li>a. Cold type composition</li> </ol> </li> <li>3. Image conversion</li> <li>4. Image transfer                             <ol style="list-style-type: none"> <li>a. Screen printing process</li> </ol> </li> <li>5. Finishing processes</li> <li>6. Occupational information</li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Utilize the principles of design to prepare thumbnail sketches, rough and comprehensive layouts.</li> <li>a. Prepare an original copy which would be suitable for one of the following stencil methods: cut paper, Tusche, or hand cut film.</li> <li>a. Prepare and secure a stencil to the screen, using the procedures for one of the methods selected.</li> <li>a. Understand the screen printing process.</li> <li>b. Transfer the design onto the material and clean up the screen.</li> <li>a. Finish the products, using available finishing processes such as trimming, binding, etc. (Follow proper safe procedures.)</li> <li>a. Become aware of high school programs and career opportunities available in the related career fields.</li> </ol>	<p>BOOK: <u>Graphic Communications</u></p> <p>BOOK: <u>Silk Screen Printing</u></p> <p>BOOK: <u>Silk Screen Printing</u></p> <p>BOOK: <u>Silk Screen Printing</u></p> <p>BOOK: <u>Graphic Communications</u></p> <p>PAMPHLETS: Check with the Counselling and Guidance Office.</p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<ol style="list-style-type: none"> <li>The designing of a product is an important step in arriving at a suitable product.</li> <li>The message to be printed must be assembled.</li> <li>The assembled image on the paste-up must be converted onto the proper image carrier.</li> </ol>	<ol style="list-style-type: none"> <li>Product planning</li> <li>Image assembly               <ol style="list-style-type: none"> <li>Hot and/or cold type composition</li> </ol> </li> <li>Image conversion</li> </ol>	<p>The student will:</p> <ol style="list-style-type: none"> <li>Utilize the principles of design to prepare thumbnail sketches, rough and comprehensive layouts.</li> <li>Prepare a paste-up, using available composition material and equipment.</li> <li>Prepare and secure a stencil to the screen, using proper safe photographic procedures.</li> </ol>	<p>BOOK: <u>Graphic Communications</u></p> <p>BOOK: <u>Graphic Communications</u></p> <p>BOOK: <u>Silk Screen Printing</u></p>
<ol style="list-style-type: none"> <li>The image can be transferred onto the fabric or paper using the screen printing process.</li> <li>The printed copies can undergo various processes in order to make the product more useful.</li> <li>A productive society must prepare its youth to make realistic vocational choices.</li> </ol>	<ol style="list-style-type: none"> <li>Image transfer</li> <li>Finishing processes</li> <li>Occupational information</li> </ol>	<ol style="list-style-type: none"> <li>Understand the screen printing process.</li> <li>Transfer the design onto the material and clean up the screen.</li> <li>Finish the product, using available finishing processes such as cutting, trimming, binding, punching holes, folding, etc. (Follow proper safe procedures.)</li> <li>Become aware of high school programs and career opportunities available in the related career fields.</li> </ol>	<p>BOOK: <u>Silk Screen Printing</u></p> <p>BOOK: <u>Graphic Communications</u></p> <p>PAMPHLETS: Check with the Counselling and Guidance Office.</p>

PHOTOGRAPHY/DRAFTING

Introduction

The Photography/Drafting module will provide the student with an opportunity to work with light sensitive materials under controlled lighting conditions and explore various processes and techniques used in industry. Drafting, considered to be the universal language of industry, is a very large component of the industrial process. Through "hands-on" activity, the student should gain a basic understanding of drawing interpretation and techniques used. A topic on Audio-Visual Communication is included to illustrate to the student how the basic processes and procedures used in the production and use of audio-visual material and equipment.

References

- Brown, James W. A.V. Industries: Media and Methods. McGraw-Hill, 1969
- Diamond Thomas & R.D.Ryan. A Primer of Blue Print Reading. Milwaukee: Bruce Publishing, 1967
- Harman, Earl W. Introduction to Mechanical Drafting. Boston: Allyn and Bacon, 1968
- Kohn, Eugen. Photography A Manual for Shutterbugs. Englewood Cliffs, New Jersey: Prentice Hall, 1965
- LaCour, M., and I.T.Lathrop. Photo Technology. Second Edition. Chicago: American Technical Society, 1972
- McCoy, R.A. Practical Photography. Second Edition. New York: MacMillan, 1971
- Ross. Stan. The World of Drafting. Bloomington, Illinois: McKnight and McKnight, 1971

- Rhode, R. B. and F. H. McCall. Photography. Second Edition. New York: MacMillan, 1971
- Shaeffer, G. N. and P. E. Spielmen. Basic Mechanical Drawing. Milwaukee: Bruce Publishing, 1967
- Walker, J. R. and E. J. Mevyak. Industrial Arts Drafting. Homewood, Illinois: Goodheart-Willcox, 1964
- Alberta Education. A.I.D. BOOKLETS. 1973\*
- Alberta Education. A.I.D. YEARBOOK. 1974\*
- Kodak. Various publications. Consumer Markets Division, Rochester, New York.

\*Available at the School Book Branch, Alberta Education

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Audio-visual materials are produced by various means to better communicate a persons message.</p> <p>2. The material produced must be often converted into audio or visual signals in order to transfer the image of sound to the person receiving the message.</p> <p>3. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>1. Material production</p> <ul style="list-style-type: none"> <li>a. Design</li> <li>b. Overhead transparencies</li> <li>c. Sound and video-tape recordings</li> </ul> <p>2. Presentation</p> <ul style="list-style-type: none"> <li>a. Image equipment</li> <li>b. Sound and video-tape players</li> </ul> <p>3. Occupational information</p>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Apply good design principles in material production.</li> <li>b. Identify several methods of producing an overhead transparency.</li> <li>c. Understand the basic procedures used to produce sound and video tapes.</li> <li>d. Produce one tape of audio visual material, using available equipment.</li> <li>a. Understand the basic principles used in image projection equipment.</li> <li>b. Know the basic principles used to produce video and audio signals from tapes.</li> <li>c. Know that combinations of presentation techniques can be very effective.</li> <li>d. Present the materials prepared, using the equipment available and following proper safe procedures.</li> <li>a. Become aware of high school programs and career opportunities available in the related career fields.</li> </ul>	<p>BOOK:</p> <p>A.V. <u>Instruction</u> <u>Media and</u> <u>Methods</u></p> <p>PAMPHLETS: Check with the Counselling and Guidance Office.</p>

## TOPIC: CAMERA

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
1. Early development in photography can provide an interesting learning experience. 2. All cameras contain certain basic parts.	1. History of photography 2. The Camera	The student will: a. Discuss early developments in photography. a. Be able to identify the basic parts of a camera. b. Have basic understanding of the relationship between shutter speed and f-stop. c. Construct a pin hole camera. (Optional)	BOOKS: <u>Photo Technology</u> <u>Introduction to Photography</u> <u>Practical Photography</u> <u>Introduction to Photography</u> <u>Cameras Work Like This</u> KODAK PUBLICATIONS MANUFACTURER'S DATA SHEETS
3. Light energy is used to produce an image on light sensitive film.	3. Films	a. Have a basic understanding of the composition of films and film speeds.	
4. Initial planning predetermines the quality of the completed product.	4. Product planning a. Composition	a. Briefly describe the arrangement of objects or subjects that will be used for each picture.	
5. The image to be photographed is assembled on the film by the use of a lens.	5. Image assembly a. Camera operation	a. Take pictures with the camera available, using proper care and handling procedures. b. Take pictures with a pin hole camera. (Optional)	
6. The image on the film is converted into a negative by chemical action.	6. Image conversion a. Negatives	a. Develop the film, using proper procedures and safety precautions.	



Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. By passing light through a negative, a positive image can be produced on light sensitive photographic paper.</p> <p>2. The photographic prints can undergo various processes to improve their appearance.</p> <p>3. A productive society must prepare its youth to make realistic vocational choices</p>	<p>1. Image transfer</p> <p>a. Photographic paper</p> <p>b. Darkroom procedures</p> <p>c. Contact printing</p> <p>d. Projection printing</p> <p>2. Finishing processes</p> <p>3. Occupational information</p>	<p>The student will:</p> <p>a. Have a basic understanding of the composition of photographic paper along with the terms and contrast grade, weight, surface, texture and types.</p> <p>b. Know proper procedures to follow under various light conditions.</p> <p>c. Know proper safety procedures for handling the darkroom chemicals.</p> <p>d. Produce quality projection prints from prepared negatives.</p> <p>e. Produce quality projection prints of desired size from prepared negatives.</p> <p>a. Know the procedure to produce matte, gloss or other finishes on the photographic prints.</p> <p>a. Become aware of high school programs and career opportunities available in the related career fields.</p>	<p>BOOKS:</p> <p><u>Introduction to Photography</u></p> <p><u>Photo Technology</u></p> <p><u>Practical Photography</u></p> <p>PAMPHLETS: Check with the Counselling and Guidance Office.</p>

## TOPIC: ADVANCED DARKROOM

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. A myriad of procedures exists for altering the image and for producing special effects in the darkroom.</p> <p>2. The photographic prints can undergo various processes to improve their appearance.</p>	<p>1. Advanced techniques</p> <ul style="list-style-type: none"> <li>- Contrast film</li> <li>- Cropping</li> <li>- Spot printing</li> <li>- Vignetting</li> <li>- Dodging</li> <li>- Flashing</li> <li>- Texture screen</li> <li>- distortion</li> <li>- Spotting</li> <li>- Photograms</li> <li>- Silhouette</li> <li>- Solarization</li> <li>- Bas-relief</li> <li>- Multiple printing</li> <li>- Photomontage</li> <li>- Portrait photography</li> <li>- Diffusing</li> </ul> <p>2. Finishing processes</p>	<p>The student will:</p> <p>a. Select as many advanced techniques as time will permit and demonstrate a basic understanding of the techniques chosen.</p> <p>b. Be able to evaluate and diagnose faults or errors in projection prints.</p> <p>a. Identify and use proper safe finishing procedure such as mounting, toning, etc.</p>	<p>BOOKS:</p> <p><u>Photo Technology</u></p> <p><u>Practical Photography</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Drafting is a large area used by many different industries.</p> <p>2. It is essential to understand and accurately interpret technical design, illustration and drawings, as they are a universal form of graphic communication.</p> <p>3. Most of the fundamental principles of drafting can be learned through sketching which is an important drafting procedure.</p> <p>4. Often it is necessary to produce several copies of a drawing in order to distribute them to various people concerned.</p> <p>5. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>1. Overview of the drafting areas</p> <p>2. Drawing interpretation</p> <p>a. Pictorial drawings</p> <p>b. Charts and graphs</p> <p>3. Image assembly</p> <p>a. Sketching</p> <p>4. Image transfer</p> <p>- Blueprint process</p> <p>- Ozalid process</p> <p>- Dry print process</p> <p>5. Occupational information</p>	<p>The student will:</p> <p>a. Know several of the more common types of drafting used.</p> <p>a. Know how to read and interpret pictorial drawings such as isometric and orthographic.</p> <p>b. Have a basic understanding of the use of charts and graphs.</p> <p>a. Produce several good quality pictorial drawing sketches, using proper drafting procedures.</p> <p>b. Have a basic understanding of the different lines used in drafting.</p> <p>a. Have a basic understanding that various methods of duplicating drawing are available and be able to identify at least three processes.</p> <p>b. Produce a duplicate of a sketch produced, using available processes. (Optional)</p> <p>a. Become aware of high school programs and career opportunities available in the related career fields.</p>	<p>BOOKS: A Primer of <u>Blueprint Reading</u></p> <p>BOOKS: <u>Industrial Arts Drafting</u> <u>The World of Drafting</u></p> <p>BOOKS: <u>Basic Mechanical Drawing</u> <u>The World of Drafting</u></p> <p>PAMPHLETS: Check with the Counselling and Guidance Office.</p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. It is essential to understand and accurately interpret technical design, illustration and drawings as they are a universal form of graphic communication.</p>	<p>1. Drawing interpretation</p>	<p>The student will:</p> <p>a. Demonstrate and understand in reading and interpreting technical drawings.</p>	<p>BOOK: <u>A Primer of Blueprint Reading</u></p>
<p>2. The basic fundamental principles learned in sketching can be applied to producing orderly, neat, readable drawings with the use of proper instruments and techniques.</p>	<p>2. Image assembly</p> <p>a. Instrument drawing</p> <ul style="list-style-type: none"> <li>- Pictorial drawing</li> <li>- Lettering</li> <li>- Dimensioning</li> <li>- Border</li> <li>- Title block</li> </ul>	<p>a. Use drafting instruments to demonstrate basic drafting skills.</p> <p>b. Produce several quality pictorial drawings, using the basic instruments.</p> <p>c. Complete at least one drawing, using dimensions, lettering, title block and border.</p> <p>d. Use the drafting machine to produce a drawing. (Optional)</p>	<p>BOOKS: <u>Basic Mechanical Drafting</u> <u>Introduction to Mechanical Drawing</u></p>
<p>3. Often it is necessary to produce several copies of a drawing in order to distribute them to various people concerned.</p>	<p>3. Image transfer</p> <ul style="list-style-type: none"> <li>- Blueprint process</li> <li>- Ozalid process</li> <li>- Dry print process</li> </ul>	<p>a. Have a basic understanding that various methods of duplicating drawing are available and be able to identify at least three.</p> <p>b. Produce a duplicate of a drawing produced, using available processes. (Optional)</p>	<p>BOOKS: <u>The World of Drafting</u> <u>Industrial Arts Drafting</u></p>
<p>4. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>4. Occupational information</p>	<p>a. Become aware of high school programs and career opportunities available in the related career fields.</p>	<p>PAMPHLETS: Check with the Counselling and Guidance Office.</p>

## SYNTHESIZING MODULES

### Introduction

The synthesizing modules are designed to show the inter-relationships of the various technologies as well as to enable students to synthesize their accumulated knowledge in the solution of practical problems. The objectives of these modules are best fulfilled by students who have completed several of the modules in the materials, visual communication and power technologies.

Since each synthesizing module is quite different from the next, each module will have its own objectives and suggested approach.



## CONSTRUCTION

### Introduction

Construction is a very large part of our economy and employs a large number of people in actual construction and the related industries. The purpose of this module is not to prepare students for construction trades entry, but rather to provide the students with a basic understanding of how houses are built. If the student is interested in construction, he/she should be encouraged to enroll in the high school Fabrication and Construction career field modules.

### Specific Objectives

1. To provide the student with a basic understanding of the interdependence of the various processes necessary for the successful completion of a project.
2. To provide the student with an understanding that a variety of occupational characteristics and opportunities exist in the career field of construction.
3. To provide the student with an opportunity to develop positive safety attitudes.
4. To foster in the student an appreciation of high standards of workmanship and of the dignity of work.
5. To foster an appreciation for the need of controls to maintain our environment and to provide for orderly development of residential and commercial properties.

### Suggested Approach

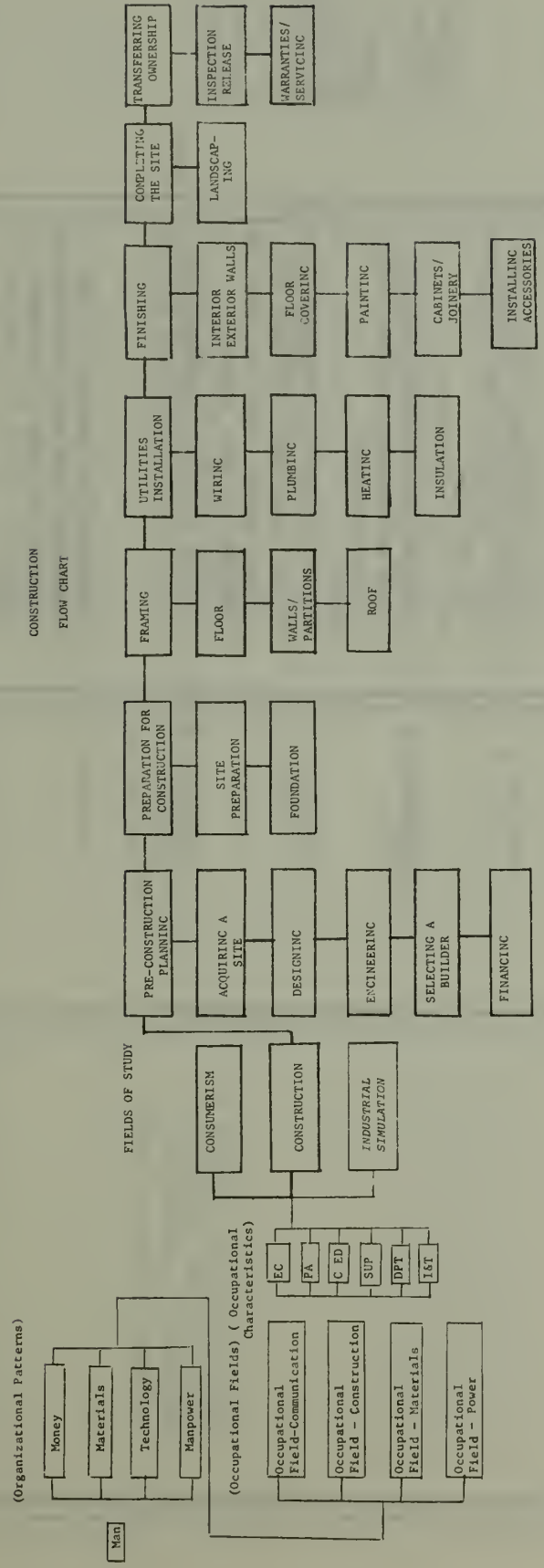
The construction module can be approached in several ways, dependent upon available space and class size. With large classes and minimum space, the building of a styrofoam model could be used to teach the concepts. Areas such as electrical work, plumbing, heating, etc., can be carried out as exercises on pre-built exercise frames. If storage space is not a problem, the building of a scaled (1/2 size) corner section of a house, etc., using standard building materials, can be employed to teach the concepts.

## References

- Hammond, James J. and others. Woodworking Technology. McKnight and McKnight, 1972
- Lux, Donald G. and Willis E. Ray. The World of Construction. McKnight and McKnight, 1970
- Lux, Donald G. and Willis E. Ray. The World of Construction; Laboratory Manual. McKnight and McKnight, 1970
- Miller, H.G. Building Construction. Toronto: MacMillan of Canada, 1968
- Wilson, Douglas J. Practical House Carpentry. McGraw-Hill, 1957
- Van Den Branden, F. and Thomas L. Hartsell. Plastering Skill and Practice. American Technical Society, 1971.



CONSTRUCTION  
FLOW CHART



Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Before construction can begin, various procedures must be followed to insure that the final project is what the customer wanted originally.</p>	<p>1. Pre-construction planning</p> <p>a. Acquiring a site</p>	<p>The student will:</p> <p>a. Know that factors such as size, topography, utilities, services and price must be considered when purchasing a lot.</p>	<p>BOOK:</p> <p><u>The World of Construction</u></p>
	<p>b. Designing</p>	<p>b. Design and produce the necessary floor plan and elevations for the home.</p>	
	<p>c. Engineering</p>	<p>c. Review the building code to gain an insight into building specifications.</p>	
	<p>d. Specifications</p>	<p>d. List the material specifications to be used for coverings for floor, walls, ceiling, etc. and window and door sizes.</p>	
	<p>e. Selecting a builder or contractor</p>	<p>e. Read a prepared contract and complete the necessary details.</p>	
	<p>f. Financing</p>	<p>f. Estimate the amount of the mortgage loan and calculate the interest on the first month's payment.</p>	
<p>2. The site for the project must be prepared so that the project can be successfully completed.</p>	<p>2. Preparation for construction</p> <p>a. Site preparation</p>	<p>a. Know that any existing structures, buildings, etc., must be removed, excess earth has to be moved, and the location of the building must be established in order to excavate for footings.</p>	<p>BOOK:</p> <p><u>The World of Construction</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>3. The basic structure of the building is constructed in order that the necessary utilities can be roughed in.</p>	<p>b. Foundation</p> <p>3. Framing</p> <p>a. Floor</p> <p>b. Walls/ Partitions</p>	<p>The student will:</p> <p>b. Know that the building must rest on solid footing and foundation.</p> <p>c. Prepare a miniature site in a sand box, locate the building, excavate and pour a concrete foundation, using necessary reinforcement material. (Optional)</p> <p>a. Glue the floor plan to a piece of hardboard and cut the floor plan out.</p> <p>Or</p> <p>Build a corner position of the floor plan, using dimensional lumber.</p> <p>b. Cut and assemble the walls and partitions for the scale model, using 1/4" styrofoam.</p> <p>Or</p> <p>Build the corner wall section, using dimensional lumber.</p>	<p>BOOKS:</p> <p><u>The World of Construction</u></p> <p><u>The World of Construction Laboratory Manual</u></p> <p><u>Building Construction</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>4. The utilities are installed into the frame of the structure in order that they can be cancelled in the finished project.</p>	<p>c. Roof</p> <p>4. Utilities Installation</p> <p>a. Wiring</p> <p>b. Plumbing</p> <p>c. Heating</p> <p>d. Insulation</p>	<p>The student will:</p> <p>c. Cut and assemble the roof for the scale model, using 1/4" styrofoam. Or</p> <p>Build the corner section of the roof using dimensional lumber and roofing materials.</p> <p>a. Make several house wiring hook-ups on a house wiring frame.</p> <p>Or</p> <p>Make several house wiring hook-ups on the corner section.</p> <p>b. Make several plumbing connections, using copper pipe. (Follow proper safety procedures)</p> <p>c. Make a boot, boot cap and duct which will be fastened to the boot with a dovetail joint. (Follow proper safety procedures.)</p> <p>d. Know the amount of insulation required in the area and install the insulation if they have built a corner section of the house.</p> <p>e. Students building the corner section will close in the walls, using available materials.</p>	<p>BOOKS:</p> <p><u>The World of Construction</u></p> <p><u>The World of Construction Laboratory Manual</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>5. The building has to be finished in order to make the interior and exterior of the building more aesthetically pleasing.</p> <p>6. A Project is not complete until the area around the building has been attractively finished.</p>	<p>5. Finishing</p> <p>a. Interior/ exterior walls</p> <p>b. Floor coverings</p> <p>c. Painting</p> <p>d. Cabinets/ Joinery</p> <p>e. Installing accessories</p> <p>6. Completing the site</p> <p>a. Landscaping</p>	<p>The student will:</p> <p>a. Become aware of several methods used to finish internal walls (eg. joint filling, plastering, etc.) and exterior walls (eg. siding, brick, etc.) and use a procedure to finish the wall of the model or corner section.</p> <p>b. Know several different floor covering procedures and use an appropriate method to cover the floor of the model or corner section.</p> <p>c. Know several different kinds of paints and their use. Select and apply proper materials to paint the model or corner section.</p> <p>d. Know the procedure to apply door and window trim, base boards, etc. Apply the necessary procedures to finish the model or corner section.</p> <p>e. Know that several accessories such as ironwork, hardware, communication, etc., are installable to finish the house.</p> <p>a. Mount the model house on a board to represent a lot, and use available landscaping techniques to complete the project.</p>	<p>BOOKS:</p> <p><u>The World of Construction</u></p> <p><u>The World of Construction Laboratory Manual</u></p> <p>BOOKS:</p> <p><u>The World of Construction</u></p> <p><u>The World of Construction Laboratory Manual</u></p>

## TOPIC: CONSTRUCTION

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>7. When the project is completed in accordance with the contract signed by the builder and customer, the customer then takes possession of the property.</p> <p>8. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>7. Transferring ownership</p> <p>a. Inspection/Releases</p> <p>b. Warranties/ Servicing</p> <p>8. Occupational information</p> <p>a. High school program</p> <p>b. Career opportunities</p>	<p>The student will:</p> <p>a. Become aware of inspection and signing releases procedures.</p> <p>b. Understand the implications and meaning of warranties and service contracts.</p> <p>a. Have an understanding of the high school program available in the related career field.</p> <p>b. Identify several occupations in the related career field and become aware of the educational requirements.</p> <p>c. Visit an open house at various high schools. (Optional)</p> <p>d. Go on field trips. (Optional)</p>	<p>BOOK:</p> <p><u>The World of Construction</u></p> <p>PAMPHLETS:</p> <p><u>Check with Counselling and Guidance Office.</u></p>

## INDUSTRIAL SIMULATION

### Introduction

Contemporary systems of manufacturing are often taken for granted by many teachers who feel that its vast organizations are too difficult for junior high school students to comprehend. Yet industry will provide most of the students with their jobs in the future. It would therefore seem imperative that adequate training be given for these future roles. This course has been developed to help demonstrate the organizational and production techniques used by today's industry.

A module in Industrial Simulation may be developed independently or it may be used to lead up to or follow a program of consumer education. To have been involved in a course of this nature should prove to be beneficial to any student taking a Production Science course at the high school level.

### Specific Objectives

A module of this nature can be made very flexible. It should, however, attempt to:

1. Develop an understanding of the relationship of the various technologies used to produce a product.
2. Recognize the need for students to work safely and co-operatively with one another.
3. Simulate the roles of various workers within a manufacturing organization.
4. Encourage students to develop their interests and abilities as they relate to the kinds of work found in industry.
5. Demonstrate that manufacturers have a social responsibility to make a safe product and to use resources wisely.

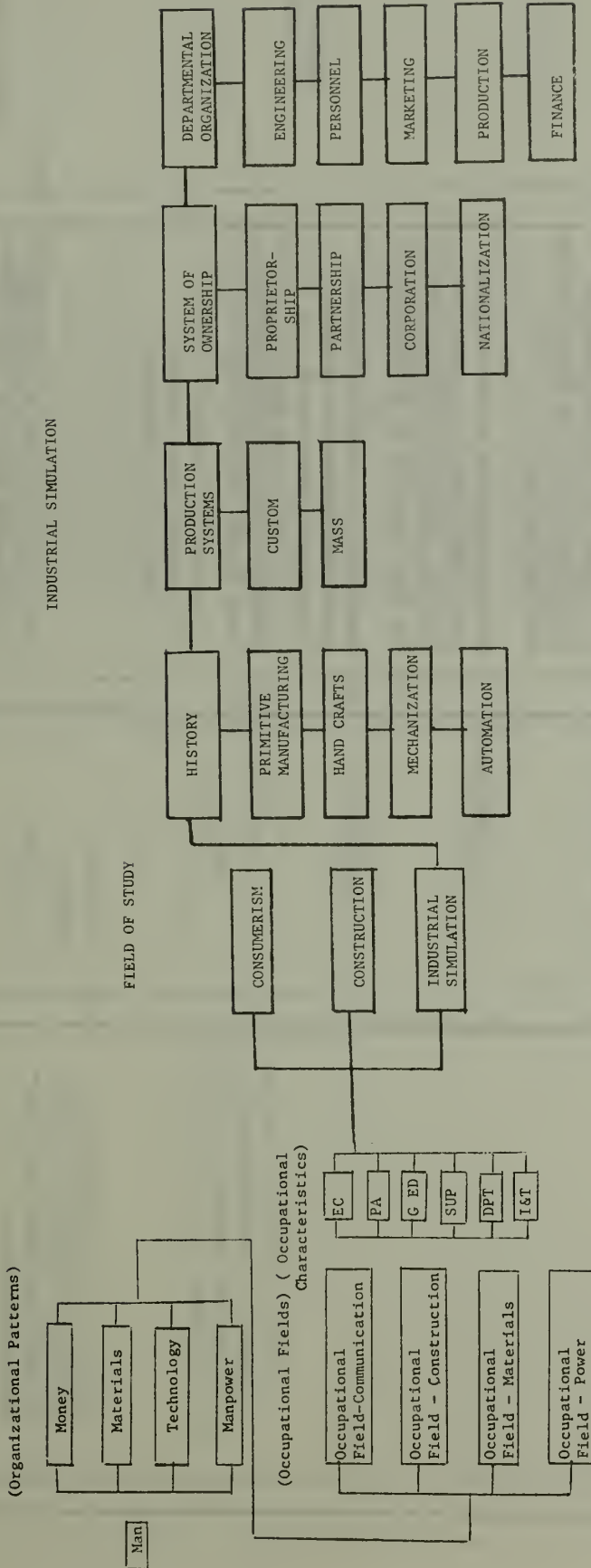
### Suggested Approach

The completion of a module in Industrial Simulation can be very rewarding for the teacher and the students. It is recommended, however, that a teacher not attempt to run more than two classes for the first time as the amount of work may be overwhelming if the teacher starts with the establishment of a company at the very beginning. The formation of the company and the organization of departments which are student-run should be left for the end of the module. Begin by introducing the concept of mass production by doing a production on several small products designed and structured by the teacher. The use of flow charts proves to be invaluable for establishing production runs.

### References

- Alberta Education. Industrial Simulation. (A.I.D.)
- Alberta Education. Industrial Simulation Product Resource Guide. (A.I.D.)
- Groneman, Chris H. and John L. Feirer. General Industrial Education. McGraw Hill, 1974
- Haws, Robert W. and Carl J. Schaifer. Manufacturing in the School Shop. American Technical Society, 1972
- Industrial Arts Curriculum Project. The World of Manufacturing. McKnight & McKnight, 1971
- Lindbeck, J.R. and Irvin T. Lathrop. General Industry. Shas. A. Bennett, 1969
- Junior Achievement Kit





INDUSTRIAL SIMULATION

FIELD OF STUDY

(Organizational Patterns)

(Occupational Fields) ( Occupational Characteristics)

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. The historical development of manufacturing will provide the student with a better insight into the production of goods.</p> <p>2. Products are produced by different systems in order to meet the needs of a productive society.</p>	<p>1. History</p> <p>a. Primitive manufacturing</p> <p>b. Hand crafts</p> <p>c. Mechanization</p> <p>d. Automation</p> <p>2. Production systems</p> <p>a. Custom</p> <p>b. Mass production</p>	<p>The student will:</p> <p>a. Find ways in which man learned to use tools as an extension of his hands and later used simple tools to make more complex ones.</p> <p>b. Note the development of specific crafts in various regions and the organization of trade groups such as guilds.</p> <p>c. List inventions and accomplishments which made it possible for the change from hand work to machine work in factories.</p> <p>d. Know that the need to produce more quickly and efficiently leads to automation.</p> <p>e. Describe the type of equipment used in automation such as:</p> <ul style="list-style-type: none"> <li>- automatic transfer devices</li> <li>- punching tape systems</li> <li>- computer programming.</li> </ul> <p>a. Locate industries such as space, housing and ship-building which manufacture individual products to meet the specific needs of the customer.</p> <p>b. List the factors which characterize mass production:</p>	<p>BOOKS:</p> <p><u>The World of Manufacturing</u></p> <p><u>Manufacturing in the School Shop</u></p> <p>BOOK:</p> <p><u>General Industry</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>3. A company can be owned by different numbers of individuals in accordance with various ownership systems.</p>	<p>3. Systems of ownership</p> <p>a. Proprietorship</p> <p>b. Partnership</p> <p>c. Corporation</p> <p>d. Nationalization</p>	<p>The student will:</p> <ul style="list-style-type: none"> <li>- standardization of parts</li> <li>- specialization of skills</li> <li>- elimination of wasted effort</li> <li>- specialization of tools</li> <li>- high volume production, low profit per unit returns.</li> </ul> <p>a. Know that the system of ownership where one person owns and operates the company is called proprietorship.</p> <p>b. Know that the system of ownership where two or more owners are each responsible for the operation of company is called partnership.</p> <p>c. Know that in a corporation, shareholders own the company while an elected Board of Directors are responsible for operation of the company.</p> <p>d. Know that in a nationalized company all people in the country or province own a portion of the company.</p> <p>e. Identify one or two companies under each system of ownership.</p> <p>f. Participate in the organization of a corporation, the preparation of products for production and sale, and the liquidation of the company.</p>	<p>BOOK:</p> <p><u>The World of Manufacturing</u></p>

## TOPIC: INDUSTRIAL SIMULATION

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>4. Various organizations or departments are established according to the needs of the company.</p>	<p>4. Department organization</p> <p>a. Engineering (Research and development)</p> <p>b. Personnel</p> <p>c. Marketing</p> <p>d. Production</p> <p>e. Finance</p>	<p>The student will:</p> <p>a. Know the responsibilities of engineers in the selection of a suitable product for manufacturing, organizing a system of production and the design of needed jigs and fixtures.</p> <p>b. Know the responsibilities of personnel in assigning and training workers in safe practices to perform specific tasks.</p> <p>c. Know that the responsibility of a marketing department is the identification of the number of products to be made, promotion of product sales and marketing of the product.</p> <p>d. Know that the responsibility of a production department is to manufacture a number of products using the most efficient methods possible.</p> <p>e. Know that the responsibility of the finance department is the sale of shares and recording of all credits and debits.</p> <p>f. Participate in as many departments as required to carry out the effective operation of the company.</p>	<p>BOOKS:</p> <p><u>Industrial Simulation</u> <u>Product Resource Guide</u> ((A.I.D.))</p> <p><u>Industrial Simulation</u> <u>(A.I.D.)</u></p> <p><u>General Industry</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>5. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>5. Occupational information</p>	<p>The student will:</p> <ol style="list-style-type: none"> <li>a. Have an understanding of the high school programs available in the related career fields.</li> <li>b. Identify several occupations in the related career fields and become aware of the educational requirements.</li> <li>c. Participate in role play related to union-management problems, etc. (Optional)</li> <li>d. Visit open house at various high schools. (Optional)</li> <li>e. Go on field trips. (Optional)</li> </ol>	<p>PAMPHLETS: Check with Counselling and Guidance Office.</p> <p>BOOK: <u>The World of Manufacturing Lab Manual</u></p>

	<p>廣州府志</p>	
	<p>卷之四</p>	
	<p>職官</p>	
	<p>職官</p>	

CONSUMERISM MODULE

Introduction

This module is intended as an activity which will require the student to utilize his knowledge of such technologies as: Graphic and Visual Communication, the Materials areas, and Laboratory Management, and to inter-relate these attained skills. The module is basically a "vehicle" through which the experienced student may experience a "total approach", integrating what previously were primarily unrelated areas of study.

A citizen in today's world is, in addition to being a producer, also a consumer of goods and services. He is encouraged by producers of these to become a better consumer in the sense of using more and more of their products. In what manner does the producer go about the task of encouraging consumption of his product or service?

The study of this question formulates the content of this module. In exploring consumerism, the student will duplicate, in a laboratory environment, the structure and techniques used by industry to increase sales of their commodities.

Specific Objectives

1. To provide a framework by which the student may realize that many technologies are integrated whenever something is produced.
2. To familiarize the student with the methods used by industry to foster consumption of their products.
3. To develop the students' abilities in the realm of management skills.
4. To enhance awareness of the need for flexibility in a worker, as a result of the need for retrained hands and minds, in our rapidly changing productive world.
5. To inculcate a grasp of the profit motive as an integral factor in today's industries.
6. To reinforce safety practices across a broad spectrum of industrial activities, with stress upon the universal application of these precautions.

### Suggested Approach

It is desirable but not essential that this module follow the completion of a Manufacturing module since it has been designed as a study of what happens to a product which has been mass-produced but not yet marketed.

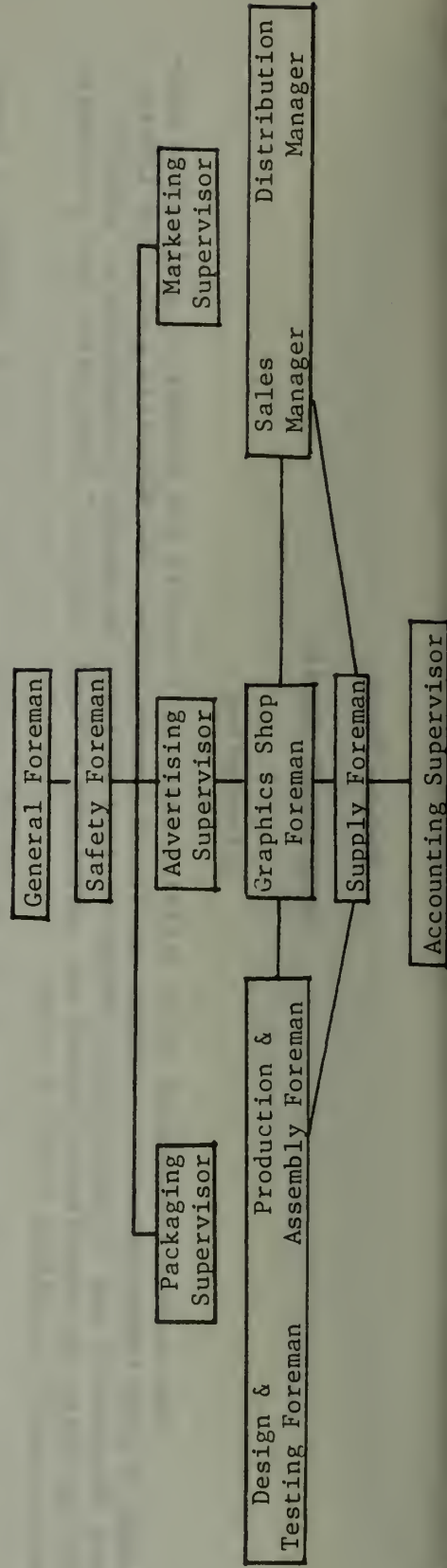
The consumerism module begins with a study of the packaging process by requiring the student to design, produce, and test various package characteristics and techniques. Once a suitable package is selected for the product, the students set up the assembly line and begin the actual packaging of the items.

The advertising industry is also explored as students utilize the skills and processes of a number of technologies to produce supportive advertising in a broad spectrum of typical media. Advertising techniques for radio, T.V., and the printed page, are all explored.

With the product packaged and supported with advertising, the actual marketing process can begin. Now the student becomes involved in the sales industry and its intricacies. Training programs and sales aids are developed and produced to assist in the selling of the product. The different methods of selling are examined and the "back-up" departments of Accounting and Supply are established. Activity in these two departments enable the student to experience some of the operational skills of the clerical and financial trades.

Throughout the module, control is maintained by a student executive structure, enabling them to gain experience in management activities.

### STUDENT EXECUTIVE



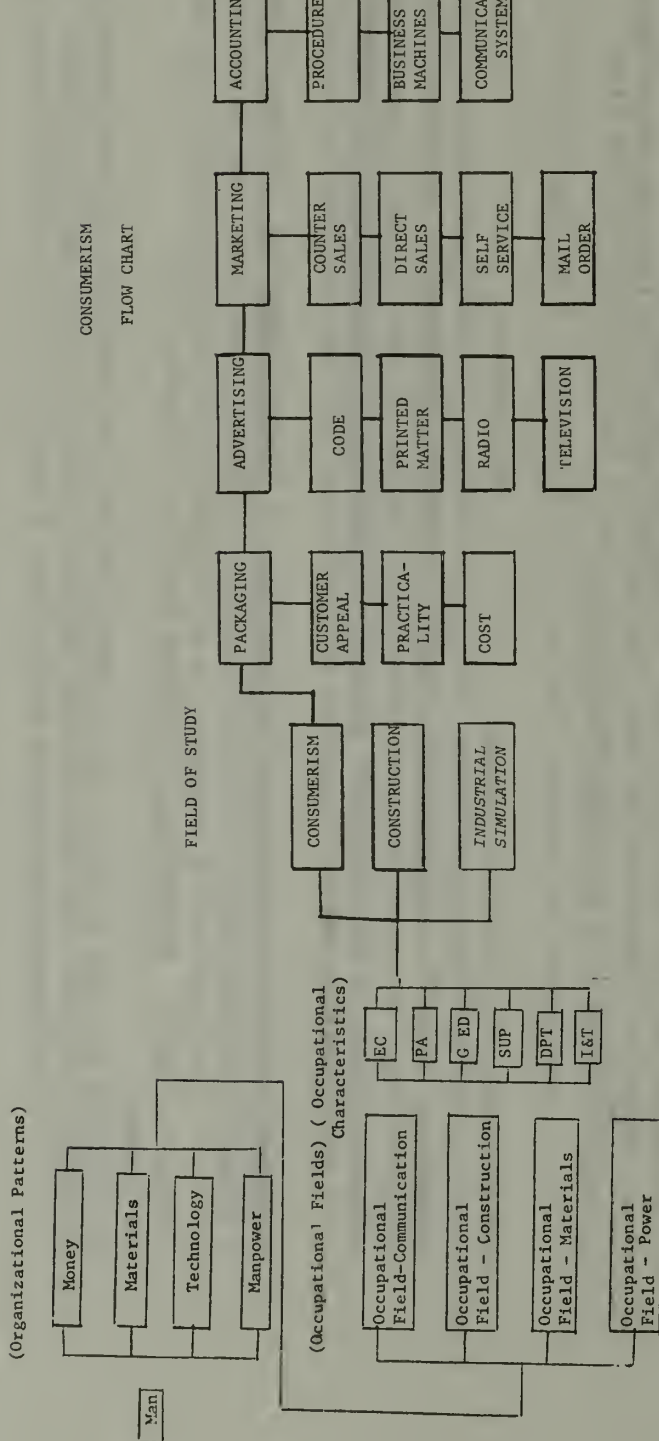


## OPERATIONAL NOTES

1. Each of the aforementioned positions is a "working position" in that all are involved in performing the hands-on activities of their area. They are not solely supervisory!
2. The General Foreman assigns tasks to students not in the above positions. He is free to shift them as he sees fit or as needs dictate.
3. If any student (other than the Safety Foreman) is unoccupied, he may be assigned as a worker in any department. It is the function of the Safety Foreman to see to the workers' safety retraining program.
4. The Accounting Supervisor reports directly to the instructor and must check policy decisions regarding finances with him. The General Foreman is likewise subordinate to the instructor in matters of policy. The instructor acts as the President of the Firm.

## References

- Banting, Peter M. Marketing in Canada. Toronto: McGraw-Hill Ryerson, 1973
- Ernest, John W. and George M. DaVall. Student Activity Guide for Salesmanship Fundamentals. McGraw-Hill, 1965
- Kaluza, Henry J. Elements of Accounting: A Systems Approach. Toronto: McGraw-Hill, 1969
- Picard, Ralph. Marketing; a Canadian Profile. Pitman, 1972



(Organizational Patterns)

(Occupational Fields) (Occupational Characteristics)

FIELD OF STUDY

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>1. Having manufactured a product, the first step in placing the product on the market is to produce a suitable package.</p>	<p>1. Packaging</p> <p>a. Customer appeal</p> <p>b. Practicality</p> <p>c. Cost</p>	<p>The student will:</p> <p>a. Know that two major factors related to customer appeal are aesthetics (size and shape) and environmental concern, and be able to list several characteristics for each.</p> <p>b. Know that the major factors related to practicality are breakage protection, see-through, storage features and anti-shoplifting features, and be able to list several characteristics for each.</p> <p>c. Know that the cost of the package is passed on to the consumer; therefore cost should be kept down.</p> <p>d. Design a package that would protect a product (i.e. blackboard chalk) from a fall of one meter, using shock absorbent material.</p> <p>e. Design a package suitable for small products (i.e. golf tees) which incorporates anti-shoplifting features.</p> <p>f. Design a package to contain an irregularly shaped product in the minimum space and in a form which can be stacked.</p>	<p>BOOKS:</p> <p><u>Marketing in Canada</u></p> <p><u>Marketing a Canadian Profile</u></p>

## TOPIC: CONSUMERISM

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>2. Various methods of advertising a product are used to reach the potential customers.</p>	<p>2. Advertising</p> <p>a. Advertising code</p> <p>b. Printed matter</p> <p>c. Radio advertising</p> <p>d. Television advertising</p>	<p>The students will:</p> <p>g. Carry out customer surveys to determine what aesthetic (size and shape) and environmental features are most preferred.</p> <p>h. Calculate the cost of several packages by considering cost of materials, production and labour. (Estimate production time; labour cost to be minimum wage.)</p> <p>a. Review the advertising code which is enforced by government agencies.</p> <p>b. Use the available equipment to compose and print support advertising material for their product(s).</p> <p>c. Prepare a tape recording of a typical radio advertisement in which an effort is made to interest the customer in purchasing an I.A. product, using such techniques as testimonials, jingles, straight facts or attention-grabbers.</p> <p>d. List several T.V. commercials that utilize special technical effects such as animation, sound effects, sex-appeal, subliminals, miniature announcer in the midst of a supersized product, etc.</p>	<p>BOOKS:</p> <p><u>Marketing in Canada</u></p> <p><u>Marketing; a Canadian Profile</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>3. The marketing of the product is accomplished through the process of selling it to a customer.</p> <p>4. Every production and marketing operation requires an accounting department whose function it is to accurately record and assess the profitability of the entire process.</p>	<p>3. Marketing</p> <p>a. Methods</p> <ul style="list-style-type: none"> <li>- counter sales</li> <li>- direct sales</li> <li>- self service</li> <li>- mail order</li> </ul> <p>4. Accounting</p> <p>a. Procedures</p> <ul style="list-style-type: none"> <li>- income</li> <li>- expenditures</li> <li>- records</li> <li>- inventory</li> </ul> <p>b. Business machines</p> <p>c. Communication systems</p>	<p>The students will:</p> <p>e. Prepare a face-to-face presentation which uses free handouts, demonstrations or door-to-door techniques for their product.</p> <p>f. Produce a T.V. commercial, using available equipment. (Optional)</p> <p>a. Know the different methods of selling products along with some of the reasons why different methods are used.</p> <p>b. Know several techniques used for each method.</p> <p>a. Participate in the setting up and operation of an accounting department to handle the affairs of the lab operation.</p> <p>b. Become aware of business machines used in industry and operate available equipment.</p> <p>c. Know that communications is a major problem in industry and identify several systems used to improve communications.</p>	<p>BOOKS:</p> <p><u>Marketing in Canada</u></p> <p><u>Marketing; a Canadian Profile</u></p> <p>BOOK:</p> <p><u>Elements of Accounting: A Systems Approach</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>5. Training of personnel to handle the required tasks in industry is a major concern.</p>	<p>5. Personnel training</p> <p>a. Suggested topics</p> <ul style="list-style-type: none"> <li>- Product selling features</li> <li>- Stimulating customers to buy</li> <li>- Financial procedures</li> <li>- Use of selling aids</li> </ul>	<p>The student will:</p> <p>a. Participate in the development of a training program which could include:</p> <ul style="list-style-type: none"> <li>- printed sales pitch brochures</li> <li>- receipt books</li> <li>- fold-out displays</li> <li>- guarantee forms</li> <li>- tape recorders</li> <li>- examples of good sales techniques</li> <li>- video-tape instruction in "How to make a sale"</li> <li>- use of selling aids (i.e. display models of the product twice normal size, miniature giveaways, animated displays, etc.)</li> </ul> <p>b. Participate, as a culminating activity, in the set-up and operation of packaging advertising, accounts training of personnel and marketing of product(s) produced in the lab or purchased in a store. (Note: This activity can be conducted within the confines of the class, school or community. Check local restrictions.)</p>	<p>BOOK:</p> <p><u>Marketing; a Canadian Profile</u></p>

Generalizations	Concepts Subconcepts	Learning Tasks	Resources
<p>6. A productive society must prepare its youth to make realistic vocational choices.</p>	<p>6. Occupational information</p> <ul style="list-style-type: none"> <li>a. High school program</li> <li>b. Career opportunities</li> </ul>	<p>The student will:</p> <ul style="list-style-type: none"> <li>a. Have an understanding of the high school program available in the related career fields.</li> <li>b. Identify several occupations in the related career fields and become aware of the educational requirements.</li> <li>c. Visit an open house at various high schools (Optional)</li> <li>d. Go on field trips. (Optional)</li> </ul>	<p>PAMPHLETS: Check with Counselling and Guidance Office.</p>




## Module Four

## STUDENT CONTRACTING

## Introduction

Student Contracting provides the necessary flexibility to allow for individual differences. After a student has completed the required information in the Materials, Visual Communication and Power Technologies, it is possible for the student to expand his/her knowledge in a particular area according to the terms specified by the teacher and student.

## Specific Objectives

1. To provide an opportunity for students to pursue their vocational interests and skills.
2. To provide an opportunity for the students to synthesize their accumulated knowledge in the solution of practical problems.

## Suggested Approach

Student contracting should be a program developed by a process of student-teacher consultation and should not imply that the student simply does what he/she wants to do. The program should go through a developmental stage beginning with "closed contracts" (The student selects from a list of teacher developed options). The second stage of contracting is the "modified contract". (Student selects and further develops the options identified by the teacher). The final stage is the "open contract". (Student defines the contract in consultation with the teacher). Some students may not be able to go through all three stages and work only at the closed contract level, while others complete all three stages.

To aid in the development of student contracts, individual student profiles should be completed in order to determine what experiences the student has had previously. The student's contract should reflect synthesizing experiences.

References

Berta, David C. "Contracting: A Possible Solution." Classroom Ideas, April, 1974

Bockman, John F. and Valerie M. Bockman. "Contracting for Learning Outcomes: Potentialities and Limitations." NASSP Bulletin, February, 1973

Cunningham, James B. and Charles H. Heimler. "Using Learning Contracts to Individualize Science Instruction." Science Teacher, September, 1972

Chamberlin, Dr. Leslie J. "Student Contracts." School and Community, March, 1975

Duersch, Fred Jr. "Questing For Voc-Ed Specialization." School Shop, November, 1975

Esbensen, Thorwald. "The Duluth Contract: What It Is and What It Does." Educational Technology, September, 1972

George, Ricky L. "The Behavior Contract: A Tool for Teachers." Education, September/October, 1973

Harvey, Ann. "Student Contracts A Break In the Grading Game." Education Canada, September, 1972

Morine, Greta and A. Ned. Flanders. "Teacher Responsiveness, Pupil Initiative, Theme and Variations." Social Education, May, 1974

Murray, Dennis. "Learning Contracts - Better Than Assignments." Instructor, August/September, 1974

O'Hanton, James and Richard Bock. "Teaching Responsibility Through Student Commitment." Theory Into Practice, October, 1973

Raymond, R. Allan. "The Contract as Alternative." The Social Studies, March/April, 1975

Steward, James W. and Jack Shank. "Student-Teacher Contracting: A Vehicle for Individualizing Instruction." Audio Visual Instruction, January, 1973

Wilson, Robert M. and Linda B. Gambrell. "Contracting - One Way to Individualize." Elementary English, March, 1973

Yarber, William L. "Comparing Contract and Tradition Grading Techniques for Ninth Grade Students." Education, Summer, 1975

## Module Five

## DEVELOPMENTAL RESEARCH

## Introduction

Industrial education is a field of study that should be constantly changing if it is to be relevant for a productive society. This means then, that new content and curriculum materials need to be developed and tested on a continuing basis. To allow time for this type of activity, provision was made in the course for a nine to twelve week unit entitled "Developmental Research."

This time-block gives the teacher the opportunity to develop new and experimental materials, following the approval of the consultant of Industrial Arts and the school principal.

## Specific Objectives

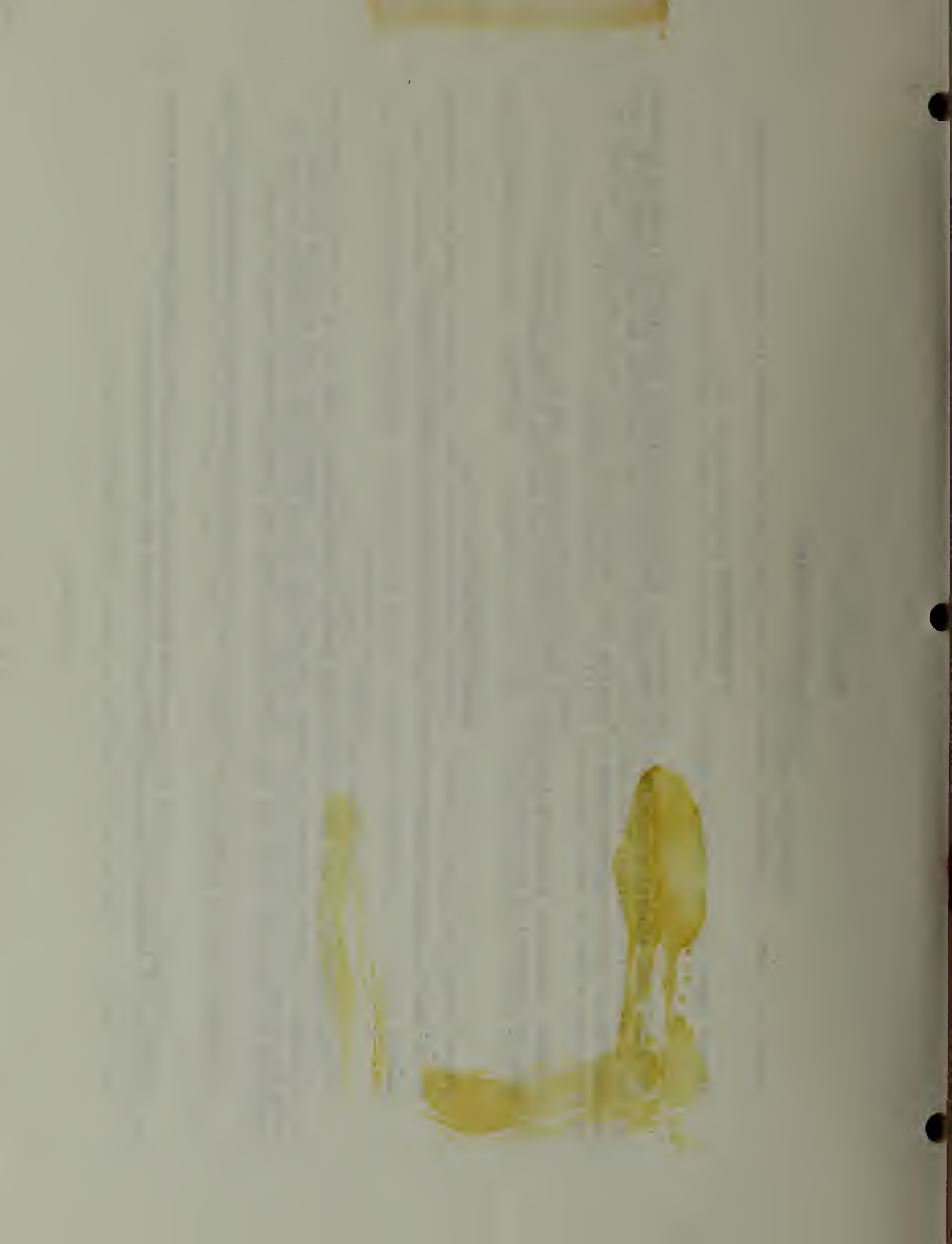
To develop new curriculum content for junior high school industrial education.

## Suggested Approach

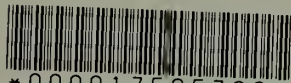
The Research unit is not circumscribed by any formal content. The course is entirely developed by the teacher. However, it must be properly documented as a research unit and should be developed using the format of the present guide. THE TEACHER MUST SUBMIT AN OUTLINE OF HIS PROPOSAL TO BOTH THE CONSULTANT OF INDUSTRIAL EDUCATION AND THE SCHOOL PRINCIPAL FOR THEIR APPROVAL BEFORE BEGINNING.

A record should be kept of activities done by the student so that an evaluation becomes meaningful.

An evaluation of the unit with possible implications for the curriculum should be submitted to the Consultant of Industrial Education at the end of the experimental period.



TT 168 A315 1976  
ALBERTA ALBERTA EDUCATION  
JUNIOR HIGH INDUSTRIAL  
EDUCATION GUIDE --  
39835375 CURR HIST



\*000017565722\*

TT 168 A315 1976  
Alberta. Alberta Education.  
Junior high industrial  
education guide. -  
39835375 CURR HIST

CURRICULUM GUIDE

**For Reference**

NOT TO BE TAKEN FROM THIS ROOM  
EXCEPT WITH LIBRARIAN'S PERMISSION

